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Bulletin 69

THE TÆNIOID CESTODES OF NORTH AMERICAN BIRDS

BY

BRAYTON HOWARD RANSOM
Assistant Custodian, Helminthological Collections, U. S. National Museum

WASHINGTON
GOVERNMENT PRINTING OFFICE
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BULLETIN OF THE UNITED STATES NATIONAL MUSEUM.

ISSUED DECEMBER 31, 1909.

2

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RICHARD RATHBUN,
Assistant Secretary, Smithsonian Institution,
In Charge of the United States National Museum.

WASHINGTON, U. S. A., *December 15, 1909.*

PREFACE.

In 1900, while a graduate student at the University of Nebraska, I undertook, upon the suggestion of Prof. Henry B. Ward, of the department of zoology, an investigation relative to the cestodes of birds. So far as the North American fauna was concerned, this topic represented a field which had scarcely been touched. Although a considerable number of species had been reported from birds occurring in North America, the descriptions of most of these forms were based upon specimens collected in other parts of the world from birds belonging to species whose range included this continent, or which had been introduced here either wild or in a state of domestication.

Owing to interruptions this investigation has never been carried out to the extent originally planned. However, a number of hitherto unknown species, and some already named but imperfectly known species, have been studied and described, and a synopsis prepared of the superfamily Tænioidea to which they belong, together with a list of all the species which have been reported as parasites of birds occurring in North America. This material was presented to the graduate faculty of the University of Nebraska as a thesis for the degree of doctor of philosophy and accepted January 4, 1908. Delay in its final preparation for publication has enabled me to take into consideration a number of recent papers, the most important of which are those of Dr. O. Fuhrmann, the well-known authority on avian cestodes. It has thus been possible to incorporate some valuable data that would otherwise have been omitted.

To Prof. H. B. Ward, of the University of Nebraska, I am indebted for much helpful advice during the progress of my investigations, and to Mr. H. C. Oberholser, of the Biological Survey, U. S. Department of Agriculture, for his kindly assistance in selecting for me the names of hosts as recognized by ornithologists at the present time.

B. H. Ransom.

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THE TÆNIOID CESTODES OF NORTH AMERICAN BIRDS.

By BRAYTON HOWARD RANSOM,
Assistant Custodian, Helminthological Collections, U. S. National Museum.

INTRODUCTORY REMARKS.

The tænioid cestodes are tapeworms characterized primarily by the presence of four cup-shaped suckers upon the head. They form a natural group, classed by some authorities as a superfamily Tænioidea, by others as an order Cyclophyllidea. At least 8 families may be recognized, and nearly 70 genera. Over 50 of these genera are represented among the species, about 500 in number, parasitic in birds. About 140 species have been reported from North American birds, and these represent nearly 40 genera. It is with these forms that the present paper is concerned. In order to render clear their relationships, it has been considered desirable to include a synopsis of the entire superfamily to which they belong, giving a diagnosis of every known genus in the group and a key to genera. By means of this key a given specimen may readily be placed in its proper genus. Under each genus is given a list of all species known to occur in North American birds, with references to the more important published descriptions which will be of material assistance in arriving at specific determinations, and in this connection the compendium of parasites arranged according to hosts will also be useful.

Preceding the synopsis are given a few notes on the collection and preservation of specimens, and descriptions of a number of species which have been specially studied.

NOTES ON COLLECTION AND PRESERVATION OF SPECIMENS.

The tapeworms of birds are found usually in the small intestine. The collection of specimens is not particularly difficult. The small intestine is slit from end to end with a pair of scissors of suitable size, and by stripping the slit intestine between the thumb and finger or by scraping the inner surface with the back of a scalpel blade the contents are removed into a tall vessel (beaker or glass cylinder) of physiological salt solution. In some cases special care is required if the heads of the worms are to be obtained, and it may be necessary to cut off and place in a shallow dish of salt solution portions of the intestine to which the worms are attached, and by careful manipulation with the back of a scalpel blade cause them to release their hold. In the tall vessel of salt solution the tapeworms and more or less ingesta will sink to the bottom within a few minutes. It is well to break up the masses or clumps of material which sometimes float on the surface of the salt solution in order to dislodge any worms which may be entangled there and thus give them opportunity to sink. When sufficiently settled, the top of the liquid should be poured off until the layer at the bottom containing the tapeworms is reached. The vessel is then filled up again and the liquid stirred a little and allowed to settle as before. This operation is repeated until the fluid is no longer cloudy when agitated. The tapeworms and such ingesta as may be remaining at the bottom are poured out with a sufficient amount of liquid into a shallow flat-bottomed glass dish, for example, a petri dish of suitable size. The worms may now be readily seen by placing the dish over a dark background, and may be picked out by means of a dissecting needle, splinter of wood, etc., or, if very small, by the use of a pipette. It is advisable, in order that very small forms may not be overlooked, that the contents of the dish be carefully examined with a lens. If the worms are small and very numerous, they may be poured with the ingesta and the supernatant liquid into a beaker, as much of the salt solution as possible removed by pouring or by drawing off with a pipette, and the killing solution then added. Otherwise it is better to pick out the worms from the ingesta and put them into a dish of clean salt solution, which may be drawn off and replaced several times in order to free the worms from mucus and adherent foreign particles.

A very satisfactory killing solution is a mixture of equal parts of 70 per cent alcohol and saturated aqueous solution of corrosive sublimate, to which, after mixing, about 1 per cent of glacial acetic acid is added. This mixture may be employed cold, but acts better when heated to about 70° or 80° C. A liberal quantity should be used. The worms may be lifted into the killing solution one by one on a wooden splinter (metal should not be used on account of the action of the corrosive sublimate, which will cause the worms to blacken where touched by the metal), or they may be dumped into the killing reagent together with the least possible quantity of salt solution, or the process may be reversed and the killing reagent poured on the worms after as much of the salt solution as possible is drawn off. When the worms are long and liable to tangle and twist into knots, the first method is preferable. Occasionally the worms, if very active, get into this condition in the salt solution, and require to be disentangled before fixation. This may generally be accomplished with the aid of a couple of dissecting needles.

According to the size of the worms, the killing solution is allowed to act from ten to twenty minutes, rarely longer. It is then poured off or removed with a pipette and replaced with 70 per cent alcohol, to which enough of a solution of iodine in alcohol is added to give it a sherry-wine tint. If after a day or two all the color has disappeared from the alcohol, more iodine solution is added, and this is repeated if necessary. When no further extraction of color is apparent, the alcohol is poured off and fresh 70 per cent alcohol added, in which the specimens may remain until required for study.

When conveniences required in the technic described above are lacking, tapeworms may be preserved by simply opening the intestine of the bird, spreading it out on a piece of board or paper, scraping off the parasites with a knife and putting them directly into 70 per cent alcohol or 5 to 10 per cent solution of formalin. Less favorable specimens are, of course, to be expected from this method than from the other.

The label should show the name of the host (it is important that the species of the bird should be accurately determined, and it is advisable to give the common name as well as the scientific name), the locality, the date, and the collector's name.

Some specimens afford toto mounts favorable for study; in others, on account of the thickness or the contracted condition of the worm, practically nothing can be made out from toto mounts concerning the internal structure, but by pressing a specimen between two glass slides after it has been softened for twelve to twenty-four hours in water and bringing it into strong alcohol again before the pressure is removed, it can generally be sufficiently flattened so that the internal structure becomes more apparent. Before this flattening is done, however, the specimens should be stained, the most generally useful stain being alcoholic acid carmine. The specimens may be stained overnight in dilute stain and then decolorized by soaking in 70 per cent alcohol, to which two or three drops of hydrochloric acid to the 100 c. c. have been added. The stage at which to stop decolorization can only be determined by experience. After staining and flattening, the specimens are dehydrated, cleared in xylene or cedar oil, and mounted in balsam. Small worms may be mounted entire, larger ones in pieces. If the head is armed with hooks and their shape and size can not be accurately determined in a toto mount, and if a sufficient number of specimens are available, preparations to show these structures may be made by tearing the heads into small pieces with fine pointed needles and mounting in glycerin, glycerin jelly, or balsam.

In addition to toto mounts serial sections are indispensable in working out the details of internal structure. These should be made with portions from various regions of the strobila chosen to show the male and female organs in different stages of development. Transverse and frontal sections are the most useful; occasionally sagittal sections are valuable. Except for fine histological details, thick sections are more satisfactory than thin ones.

DESCRIPTION OF SPECIES.

Genus DAVAINEA Blanchard and Railliet, 1891.

(For generic diagnosis see p. 67.)

DAVAINEA RHYNCHOTA, new species.

Figs. 1–4.

This species is represented by specimens in the collection of the U. S. National Museum, and of H. B. Ward, collected in Nebraska, Iowa, and Maryland, from *Colaptes auratus* and *Melanerpes erythrocephalus.*

The type-specimens (from the collection of H. B. Ward, deposited in the U. S. National Museum Helminthological Collection, No. 7235) were collected in Iowa from *Colaptes auratus.*

External anatomy.

The length of this form is 50 to 60 mm., the maximum width about 1 mm.

The head (fig. 1) measures 360 to 380μ long and 320 to 380μ broad. Its anterior portion forms a large protuberance, cylindrical or truncate conical in shape, measuring 160μ in length by 150 to 250μ in breadth. The surface of this protuberance, as in *Davainea frontina* (Dujardin), is thickly covered with minute spines arranged in diagonal rows. The rostellum proper is a muscular bulb, broad (120 to 160μ) and flat, embedded in the anterior end of the spine-covered protuberance. It is armed with a crown of alternating longer and shorter hooks (figs. 2*a* and *b*), 18 and 14μ in length, respectively, and about 400 in number. Instead of being circular the crown of hooks forms a rosette with 8 limbs.

The suckers are round, 150 to 160μ in diameter, with their borders armed with numerous hooklets (fig. 2*c*) of varying size up to 10μ, arranged in diagonal rows, 16 to 18 hooklets in each row.

The neck is somewhat narrower than the head, measuring 160 to 250μ in breadth, and varying in length according to the state of contraction (observed maximum 400μ). The first segments are equal in width to the neck and are very short, gradually increasing in both dimensions toward the posterior end of the strobila, where they measure 0.5 mm. in length and 1 mm. in width. The number of segments in a strobila 50 mm. long was about 175. The posterior 8 or 10 segments in this strobila contained fully formed eggs. In shape the segments are trapezoidal, broader than long, and the posterior border of each segment overlaps more or less the anterior portion of the next following segment.

The genital pores are unilateral on the left-hand margin of the strobila, located slightly in front of the middle of each segment.

Internal anatomy.

Nervous system.—The lateral longitudinal nerves are well developed, situated toward the lateral borders of the segment just within the inner layer of longitudinal muscles.

Muscle system.—The longitudinal muscles are arranged in two layers; a thicker outer layer of several irregular rows of very numerous small bundles and a thinner inner layer of larger bundles in a single row, about 40 in number, 20 in the dorsal and 20 in the ventral half of the segment. The dorso-ventral and transverse muscle systems are very weakly developed.

Excretory system.—The dorsal (fig. 3, *d. ex.*) and the ventral excretory canal are situated in about the same vertical longitudinal plane a short distance from the lateral nerve on its inner side. The dorsal canal is, as usual, the smaller and its course more wavy.

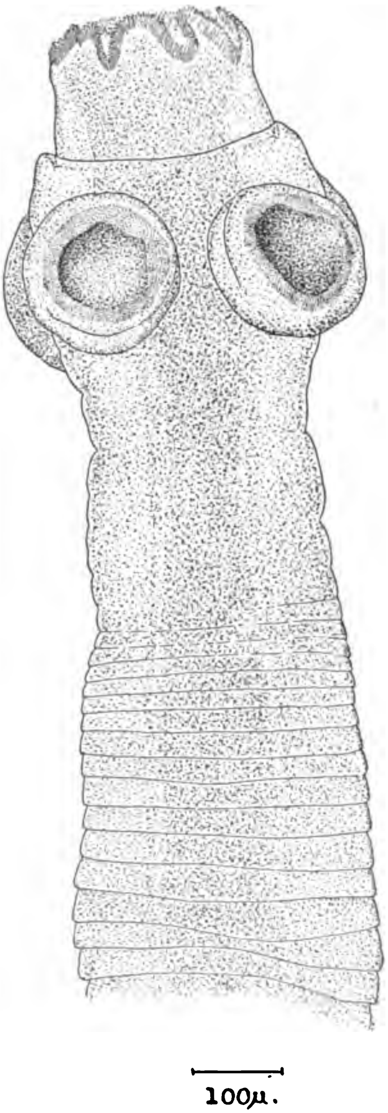

FIG. 1.—DAVAINEA RHYNCHOTA: HEAD AND ANTERIOR PORTION OF STROBILA.

In a segment in which the ventral canals measured 60μ in diameter the dorsal canals measured 15μ. The ventral canals are connected by a transverse canal in the posterior portion of each segment; the dorsal canals (fig. 3) are also connected in the same region in most of the segments by a slender transverse canal.

With the exception of the cirrus pouch and the distal portion of the vagina, the reproductive organs are all contained in the medullary portion of the segment, as the portion within the inner longitudinal muscle layer may be termed. The vas deferens and vagina pass between the dorsal and ventral excretory canals and dorsal of the lateral longitudinal nerve.

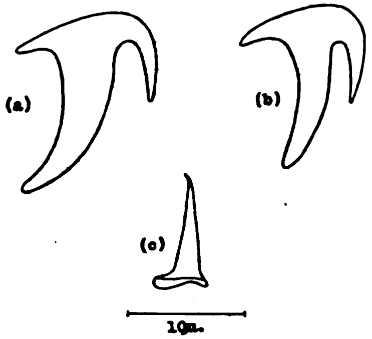

FIG. 2.—DAVAINEA RHYNCHOTA: HOOKS. (*a*) LARGE HOOK FROM ROSTELLUM. (*b*) SMALL HOOK FROM ROSTELLUM. (*c*) HOOK FROM SUCKER.

Male reproductive organs.—The testicles (fig. 3, *t.*) are of the usual oval shape, elongated dorso-ventrally, measuring 60 to 120μ in diameter, in number about 24. They are located in the lateral and posterior portions of the segment, inside of the inner layer of longitudinal muscles, extending forward to the anterior border of the segment on the dextral side. On the sinistral side of the segment the testicles do not extend so far forward, the anterior third of the segment on this side being occupied by the vas deferens and seminal receptacle.

In segments in which the female glands are at the height of their development the testicles in the middle third of the segment are crowded toward the sides and are then disposed in two groups, one in each lateral third of the medullary portion of the segment. In a segment containing 22 testicles, 9 were located on the left-hand (pore) side of the segment and 13 on the right-hand side. The vasa efferentia unite near the middle of the segment, toward the dorsal

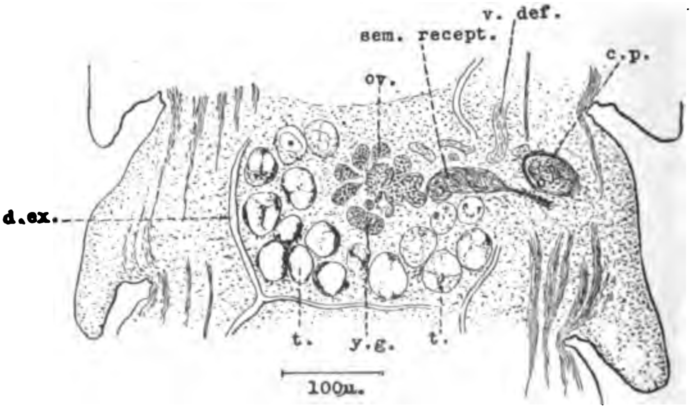

FIG. 3.—DAVAINEA RHYNCHOTA: SEXUALLY MATURE SEGMENT, HORIZONTAL SECTION. *c. p.*, CIRRUS POUCH. *d. ex.*, DORSAL EXCRETORY VESSEL. *ov.*, OVARY. *sem. recept.*, SEMINAL RECEPTACLE. *t.*, TESTICLES. *v. def.*, VAS DEFERENS. *y. g.*, YOLK GLAND.

side of the medullary portion, to form the vas deferens, which extends forward nearly to the anterior border of the segment, and then laterally in a very tortuous course toward the genital pore. The mass of coils formed by the vas deferens occupies most of the anterior third of the medullary portion of the segment on the left-hand side of the median line. The middle portion of the vas deferens is commonly dilated in older segments, forming a capacious seminal reservoir measuring 40 to 60μ in diameter; the remainder of the vas deferens measures about 10μ in diameter.

The cirrus pouch (figs. 3, 4, *c. p.*) measures 115 to 135μ in length and has the pyriform shape common in the genus *Davainea.* The outer muscular layer is very thin, 2 to 3μ, the fibers running mostly lengthwise in the basal portion and transversely in the distal portion of the pouch. The vas deferens after entering the cirrus pouch is supplied with a muscular wall, and its terminal portion is modified to form the cirrus, which in the retracted condition measures 50 to 60μ in length and 2 to 4μ in diameter, without apparent spines.

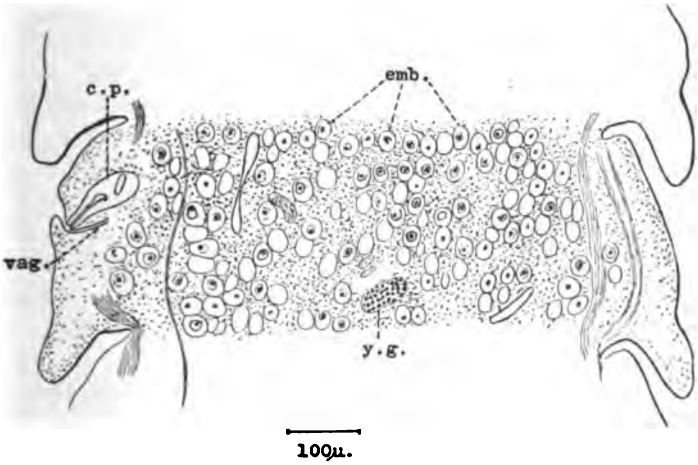

FIG. 4.—DAVAINEA RHYNCHOTA: GRAVID SEGMENT, HORIZONTAL SECTION. *c. p.*, CIRRUS POUCH. *emb.*, EGGS. *vag.*, VAGINA. *y. g.*, YOLK GLAND.

Female reproductive organs.—The vagina (fig. 4, *vag.*) opens into the genital sinus immediately behind the male opening, and extends inwards along the posterior side of the cirrus pouch. The distal portion of the vagina has a thick muscular wall and measures from 200 to 235μ in length. Before crossing the excretory canals the vagina becomes very thin-walled, and in older segments the thin-walled portion is dilated to form an elongated seminal receptacle (fig. 3, *sem. recept.*). Near the center of the segment the vagina joins the oviduct.

The ovary (fig. 3, *ov.*) is situated in the middle of the segment, and measures about 250 to 320μ in width when fully developed. It is a compact lobulated organ deeply hollowed out behind. In this space is situated the yolk gland (fig. 3, *y. g.*) ventrally, and the shell gland dorsally. The yolk gland measures from 75 to 100μ in diameter and the shell gland from 30 to 50μ.

As in other members of the genus *Davainea*, a definite functional uterus is not developed. The eggs (fig. 4, *emb.*) in gravid segments are scattered throughout the medullary portion, isolated in the parenchyma and not grouped together in capsules. They are surrounded by three membranes, a thin inner one close to the oncosphere, which measures 20 to 25μ in diameter, a thicker middle one 27 to 33μ in diameter, and a thin outer membrane 35 to 50μ in diameter. The last is apparently deposited by small cells 4 to 6μ in diameter, with deep staining nuclei about 2μ in diameter, which largely fill up the spaces between the eggs.

Remarks.

Davainea compacta Clerc (1906, p. 725, fig. 22) from *Oriolus galbula* is very similar to *D. rhynchota.* As described by Clerc it is 150 mm. in length by 1.3 mm. in breadth. The scolex is 330μ in diameter. The rostellum is armed with about 400 hooks arranged in two rows. The larger hooks measure 15μ in length. The hooks on the suckers measure 10μ in length. The segments are always broader than long. The genital pores are unilateral and the genital canals pass between the excretory vessels. The testicles are about 25 in number and the cirrus pouch measures 150μ in length. The ovary occupies about one-third the width of the segment. The eggs are very small, the embryo measuring but 14μ in diameter, and they are contained singly in egg capsules.

Davainea compacta and *D. rhynchota* correspond very well in the size of the head, number, and size of hooks on the rostellum, their arrangement in a double crown, size of the hooks on the suckers, unilaterality of the genital pores, shape of the segments, number of testicles, size of the ovary, and the arrangement of the eggs singly in egg capsules. *Davainea compacta*, however, is a much longer species than *D. rhynchota* (not an important difference), the cirrus pouch is somewhat larger, and the eggs are much smaller, the embryo of the former being but 14μ in diameter, of the latter about 25μ. The two apparently differ in regard to the rostellum. The presence of spines over the surface of the very prominent rostellum, and the rosette arrangement of the hooks are marked features of *Davainea rhynchota*, which would hardly have been overlooked by Clerc if they were present in *Davainea compacta.* The differences between the two forms seem fully sufficient to justify the recognition of the two species.

Of the tapeworms which have been reported from woodpeckers, *Davainea cruciata* (Rudolphi) and *D. longispina* Fuhrmann, 1908, are the only other species of this genus besides *Davainea rhynchota*, in which the eggs are not grouped in egg capsules. *Davainea cruciata*, as described by Fuhrmann (1909, p. 111) from the type-specimens, possesses only about 200 hooks on the rostellum, and the cirrus pouch measures only about 70μ in length. This species is therefore clearly different from *D. rhynchota*. That *D. longispina* as described by Fuhrmann (1909, p. 112) is a different species from *D. rhynchota* is evident from the facts that the rostellum measures but 64μ in diameter and that the genital pore is located in the posterior half of the segment.

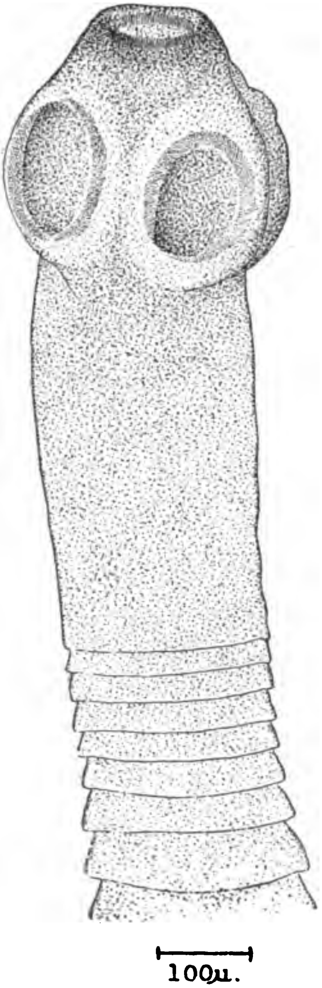

FIG. 5.—DAVAINEA COMITATA: HEAD AND ANTERIOR PORTION OF STROBILA.

DAVAINEA COMITATA, new species.

Figures 5–8.

This form occurs in *Colaptes auratus* and *Melanerpes erythrocephalus*, commonly in company with the preceding species. It has been collected in Iowa, Nebraska, and Maryland. The type-specimen (from the collection of H. B. Ward, deposited in the U. S. National Museum Helminthological Collection, No. 7234) was collected in Iowa from *Colaptes auratus*.

External anatomy.

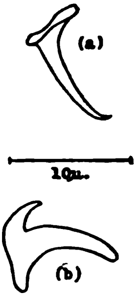

FIG. 6.—DAVAINEA COMITATA: HOOKS. (*a*) FROM SUCKER. (*b*) FROM ROSTELLUM.

Davainea comitata measures 45 to 55 mm. in length, with a maximum breadth of 1.16 mm.

The head (fig. 5) is 250 to 320μ long and 250 to 290μ broad, covered thickly with minute spines in its anterior portion over a zone about 75μ in width bordering the rostellum. This spine-covered zone corresponds to the prominent protuberance of the head in *Davainea rhynchota*. The rostellum is about 90μ in diameter, armed with a crown of about 80 hooks (fig. 6*b*) 11 to 13μ long arranged in a single row.

The suckers are oval, 115 to 135µ wide by 160µ long, armed with numerous hooklets (fig. 6*a*) 10µ and less in length, arranged in diagonal rows on the border of the suckers, 16 to 18 in each row.

The neck is of variable length up to 400µ, and measures in width from 200 to 300µ.

The segments are similar in shape to those of *Davainea rhynchota* and increase gradually in size toward the posterior end of the strobila. In a strobila 45 mm. long the number of segments was approximately 175, of which the last 17 contained egg capsules. A segment (No. 130) in the middle of the strobila measured 320µ in length by 880µ in width, and a segment at the end of the strobila measured 650µ in length by 1.6 mm. in breadth. In some cases the gravid segments are equal in length and breadth.

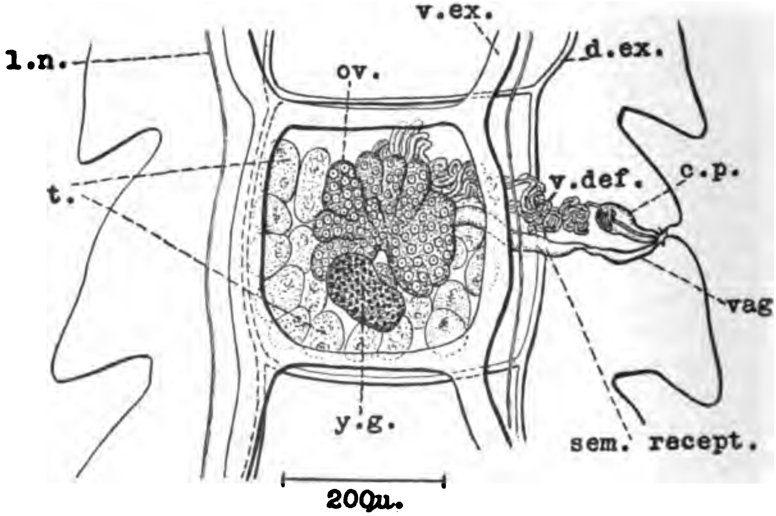

FIG. 7.—DAVAINEA COMITATA: SEXUALLY MATURE SEGMENT, RECONSTRUCTION FROM SECTIONS, VENTRAL VIEW. *c. p.*, CIRRUS POUCH. *d. ex.*, DORSAL EXCRETORY VESSEL. *l. n.*, NERVE CORD. *ov.*, OVARY. *sem. recept.*, SEMINAL RECEPTACLE. *t.*, TESTICLES. *vag.*, VAGINA. *v. def.*, VAS DEFERENS. *v. ex.*, VENTRAL EXCRETORY VESSEL. *y. g.*, YOLK GLAND.

The genital pores are unilateral on the left-hand margin of the strobila, situated in about the middle of each segment.

Internal anatomy.

The nervous system, musculature, and excretory canals are arranged as in *Davainea rhynchota*, and the relative location of the reproductive organs is the same.

The vas deferens and vagina pass between the excretory canals and dorsal of the nerve cord, as in the other species.

Male reproductive organs.—The testicles (fig. 7, *t.*) number from 30 to 35, arranged in a mass occupying the lateral and posterior portions of the segment within the inner field. As in *Davainea rhynchota*, on the right-hand side this mass extends nearly to the anterior border of the segment; on the left-hand (pore) side it is limited to the posterior two-thirds. The vas deferens (fig. 7, *v. def.*) forms a mass of coils in the anterior third of the segment extending from the median line to the base of the cirrus pouch. The cirrus pouch (figs. 7, 8, *c. p.*) is pyriform in shape, with thin outer muscular wall, as in *Davainea rhynchota.* It is, however, somewhat smaller in the present species, measuring 90 to 100μ in length by 45 to 50μ in diameter in its widest portion. The arrangement in the pouch of the vas deferens and cirrus is similar to that in the other species. The cirrus is without apparent spines, and measures in the retracted condition about 50μ in length by 2 to 4μ in diameter.

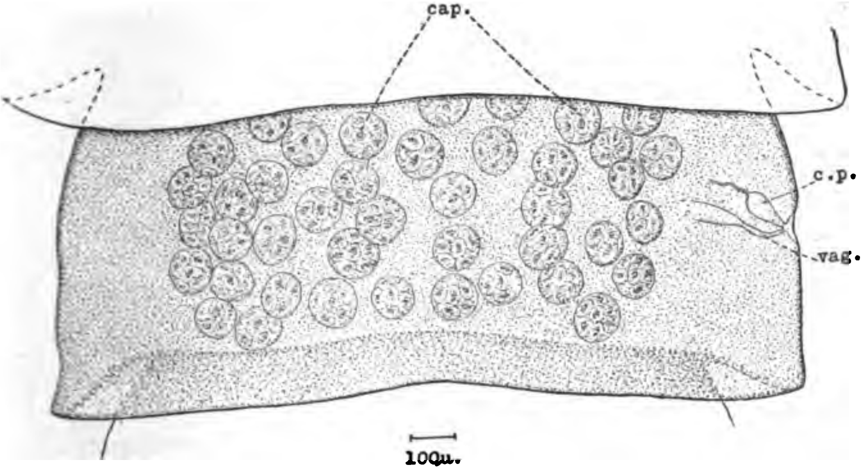

FIG. 8.—DAVAINEA COMITATA: GRAVID SEGMENT, VENTRAL VIEW. *cap.*, EGG CAPSULES. *c. p.*, CIRRUS POUCH. *vag.*, VAGINA.

Female organs.—The vaginal opening is immediately posterior of the male opening. The vagina and seminal receptacle are in this form similar to those of *Davainea rhynchota*, with the exception that the vagina for a distance of 25μ from the genital pore is constricted, and this constricted portion is surrounded by a bulbous sphincter.

The ovary (fig. 7, *ov.*), located as in *Davainea rhynchota*, is similar in shape, lobulation, etc., and measures about 200μ in width at its maximum of development.

Posterior and ventral of the ovary is the yolk gland (fig. 7, *y. g.*) 100 to 130μ in diameter, and dorsal and anterior of the latter is the small shell gland, 50μ in diameter.

In the gravid segment the eggs are grouped 6 to 12 together in egg capsules (fig. 8, *cap.*), measuring 80 to 90μ in diameter. From 40 to 50 capsules are visible from a surface view of the segment. They are confined to the medullary portion of the segment inside the inner layer of longitudinal muscles. The eggs are supplied with two thin membranes, an inner one close to the oncosphere, which measures 18 to 20μ in diameter, and an outer one 30 to 35μ in diameter.

Remarks.

In addition to *D. comitata*, two species of *Davainea*, in which the eggs are grouped in egg capsules, have been reported from woodpeckers—namely *Davainea frontina* (Dujardin) and *D. lutzi* Parona. It is possible that in *D. cruciata* (Rudolphi) also there is a grouping of the eggs in egg capsules, but Fuhrmann (1909, p. 111) says that the eggs, probably, are isolated in the parenchyma, as in *D. longispina* Fuhrmann. *D. comitata* is certainly, however, specifically different from *D. cruciata*, since it possesses only about 80 hooks on the rostellum, whereas the latter has about 200. *Davainea frontina* has about 280 hooks and is thus distinct from *D. comitata*. The size of the hooks in *D. lutzi*—namely, 18 to 19μ in length—distinguishes this species from *D. comitata*, whose hooks are only 11 to 13μ in length. The two species are also different, in that *D. lutzi* has but 12 to 16 egg capsules in each segment (Fuhrmann, 1909, p. 112), while *D. comitata* has 40 to 50.

Genus LIGA Weinland, 1857.

For generic diagnosis see p. 80.)

The genus *Liga*, proposed by Weinland (1857b, p. 62), has up to the present time received practically no recognition by other authors, and in few instances has it even been mentioned. Stiles (1906a, p. 62) lists *Liga* as a possible synonym of *Davainea* and also refers to it in an earlier paper (1903hh); it has also been noted by Fuhrmann (1907a, p. 292; 1908a, p. 60), but other writers have passed it by without comment.

Weinland's original description of *Liga* and its type species *Liga punctata* is as follows:

OBSERVATIONS ON A NEW GENUS OF TÆNIOIDS.

In the middle of April, 1856, I found a single living specimen of a new kind of tapeworm in the small intestine of our gold-winged woodpecker (*Picus auratus*). This *Tænia* is remarkable for the structure of its organs of reproduction.

As in the human tapeworm (*Tænia solium*), so also in this, the genital openings alternate from one articulation to the next; but in the former, and as seems generally to be the case in Tænioids, the testicles lie in the middle of each articulation. (See von Siebold, Vergleichende Anatomie der wirbellosen Thiere, p. 147; and the figure in Blanchard, Recherches sur l'organization des Vers, pl. 15, figs. 4, 7.) They were placed, on the contrary, in the tapeworm of the woodpecker, in the anterior part of the articulation, just in front of the genital opening, filling up by a large mass of convolute spermatic canals all that part of the articulation, and thus excluding from it the uterus. Furthermore, the uterus did not consist of branched, tree-like canals (see Blanchard, l. c.), but, on the contrary, of a large number of balls, perhaps connected with each other by slender ducts. Von Siebold (l. c., p. 146, and note 23) seems to speak of a similar structure observed by him or Della Chiaje in *Tænia ocellata*, and Dujardin (Histoire naturelle des helminthes, Paris, 1845) has observed exactly the same structure of the uterus in a tapeworm of the European *Picus major*.

As in other tapeworms, the spermatozoa were very fine, filiform, of one diameter throughout, without the so-called head or body of other spermatozoa. But what was very strange, these spermatozoa were of very different lengths; some twisted, thrice or even four times as long as others. Moreover, they would readily break into pieces and were not so soft and pliable as they generally are. I saw several break into two pieces (particularly when coming out from the cirrus bag) and both pieces moved on. Whether this phenomenon occurred accidentally or whether it was a natural characteristic of these spermatozoa I am at a loss to say. No water was used in the examination, of the bad effects of which upon spermatozoa I am fully aware. In either case this is a subject worthy the investigation of physiologists, for such a power of division would imply a nature in these spermatozoa entirely different from what we have hitherto observed. Other spermatozoa present individual elements; on the contrary, those of this tapeworm would be really dividual, at least virtually, as they have the faculty of dividing and thus multiplying themselves. Not the slightest difference could be observed in activity, movement, or form between the divided portions and the whole animals, so that we may suppose that each of the divided pieces had the fructifying power as well as the others. Furthermore, the motion of these spermatozoa was extraordinary. Whilst others move in a peculiar, quick, vibratory manner, these progress much more slowly in a succession of long curves, reminding one of the motion of an eel at the bottom of a river.

This same tapeworm is also remarkable for the strange shape of its eggs. While the eggs of tapeworms generally are globular or oval, the shape of these was that of a large ball running out on both sides into tubes which terminated in balls of about half the diameter of the central one. I found these eggs in all stages of development, some containing nothing but a clear yolk, while others presented embryos with six little spines. The yolk as well as the embryo was found only in the central ball, and there also the yolk membrane terminated. Thus the lateral tubes of the egg, as well as the balls in which they terminated, are to be considered merely as excrescences and appendages of the outer (the third) coating of the egg. Similar appendages to the eggs of tapeworms have been met with previously by other observers, namely, threads running out on two sides in *Tænia infundibuliformis* and *planiceps*, by von Siebold (l. c., p. 148), and *Tænia cyathiformis*, by Dujardin (l. c., p. 568, and figured pl. 9, fig. R., 2), while von Siebold (l. c.) describes the eggs of the same worm as provided at the pointed ends of their outer pear-shaped coatings with two bladder-like appendages, which remind one more of the new form just described. Two delicate tufts, one on each side, have been observed by Meissner in *Mermis nigrescens* (Beitræge zur Anatomie und Physiologie der Gordiaceen, in von Siebold and Kölliker's Zeitschrift f. Wissensch. Zool., vol. 7, pl. 2, fig. 2), and by Siebold (l. c.) in *Tænia variabilis*. All these appendages belong to the third coating of the egg, adjoining the so-called chorion. Analogous appendages are found in the eggs of sharks and skates. Some of the embryos were hatched under my eyes, and in spite of the greatly different organization of the adult worms, their organization was seen to be throughout identical with that of the embryos of the genuine *Tænias* (those of man, dog, cat, etc.), namely, a roundish disk, containing smaller and larger granules, and provided with six little spines, disposed in three pairs, two lateral and one in front. * * *

The new genus, which we found upon the structural peculiarities mentioned above, we will call *Liga*, and the species, from its many yellowish-brown dots, *punctata*.

A full description of both genus and species, with drawings, will be given on some future occasion.

In 1858 (1858c, pp. 14, 16, 52) Weinland refers a number of times to the tapeworm from the golden-winged woodpecker, and although he does not use the name *Liga punctata* there can be no doubt that he has in mind the species which he described in 1857. Weinland (1858c, p. 52) classes the "Tænioid from the golden-winged woodpecker" in the subgenus *Dilepis*, genus *Hymenolepis*, from which fact inferences may be drawn with regard to certain characters of *Liga punctata* which were not clearly defined in the earlier paper.

The following characters are given by Weinland for the genus *Hymenolepis:* "The outer shell of the egg membranaceous; one, rarely two, rows of small hooklets on the proboscis. The hooklets much less developed than in the Sclerolepidota. Uterus consisting of ball-like blind sacs." In the subgenus *Dilepis* "the egg has two shells only; the outer shell is membranaceous, and often bears strange appendages."

By combining these data with the description given in the earlier paper we find the essential characters of *Liga punctata* to be as follows:

Head armed with one or two rows of small hooklets. Strobila with many yellowish-brown punctations. Genital pores alternate at or in front of the middle of the segment. Vas deferens[a] forming a mass of coils in the anterior portion of the segment in front of the genital pore. Uterus consisting of a large number of blind sacs, perhaps connected with one another. Eggs with two shells; outer shell membranaceous, with a tubular process at each pole terminating in a globular expansion.

Although from the more modern standpoint, Weinland's account of *Liga punctata* is rather meager, the characters given would seem sufficient to enable the species to be recognized in case it should again be met with, and I believe that there can be no reasonable doubt that certain tapeworms which I have found in the golden-winged woodpecker (*Colaptes auratus*) belong to the identical species described by Weinland. Furthermore, it appears upon comparing these specimens with Fuhrmann's (1907b, p. 521) description and figure of *Fuhrmannia brasiliensis* from *Picus*, species, Brazil, incompletely described by Parona in 1901, that the latter is of the same species.

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[a] The large mass of convolute spermatic canals in the anterior part of the segment, which Weinland (1857b) mentions, evidently represents the vas deferens, and not, as misinterpreted by Weinland, testicles.

In accordance with the International Code of Zoological Nomenclature the name *Liga punctata* is invalid, since prior to the publication of this name the species to which it belongs was referred to under the name of *Tænia punctata*, which is a homonym of *Tænia punctata* Rudolphi, 1802. This reference (Weinland, 1856a, p. 25) is as follows:

> In another and new species of tapeworm, the *Tænia punctata* Weinl., found in the golden-winged woodpecker, he had observed the embryo just hatching. The shell of the egg of the worm has two processes, each terminating in a large ball; the embryo is provided with six spines.

Tænia punctata Weinland, 1856, being a homonym, and *Liga punctata* accordingly invalid, the species takes the next available name, which is *Liga brasiliensis* (Parona, 1901).

LIGA BRASILIENSIS (Parona, 1901) Ransom, 1909.

Figs. 9–14.

Tænia punctata WEINLAND, 1856a, p. 25 (not *T. punctata* RUDOLPHI, 1802).—BRAUN, 1894a, p. 1143; 1900a, p. 1670.

Liga punctata WEINLAND, 1857b, p. 62.—STILES, 1903hh, pp. 19, 20; 1906a, p. 62.—FUHRMANN, 1907a, p. 292; 1908a, pp. 60, 61, 169.

Fuhrmannia brasiliensis PARONA, 1901b, pp. 10–11; 1901a, pp. 8–9.—FUHRMANN, 1907b, p. 521, fig. 12; 1907a, p. 292; 1908a, pp. 28, 60, 61.

Fuhrmann describes *Fuhrmannia brasiliensis* as a very small cestode, consisting when mature of only about 16 proglottids; its length scarcely 3 mm., its greatest breadth 0.5 mm. The scolex has a diameter of 0.39 mm., suckers 0.15 mm. The rostellum is armed with a double crown of hooks, which are almost exactly similar in shape. Each crown consists of 10 hooks, the larger of which measure 0.043 mm., the smaller 0.039 mm. in length. Genital pores regularly alternate. Testicles 12 to 14 at posterior border of segment. Cirrus pouch small, pyriform. Cirrus surrounded at its base by a crown of long fine spines, forming in the genital cloaca a small dark staining cone. The last segment is entirely filled with the sac-like uterus and measures 0.7 mm. in length and 0.5 mm. in breadth. Oncosphere 0.027–0.03 mm., outer membrane, 0.043 mm. in diameter. The outermost shell appears to have not yet developed.

The specimens upon which the following description is based were collected from the small intestine of a golden-winged woodpecker (*Colaptes auratus*) killed near Bowie, Maryland. They are preserved in the Helminthological Collection of the Bureau of Animal Industry, No. 4577.

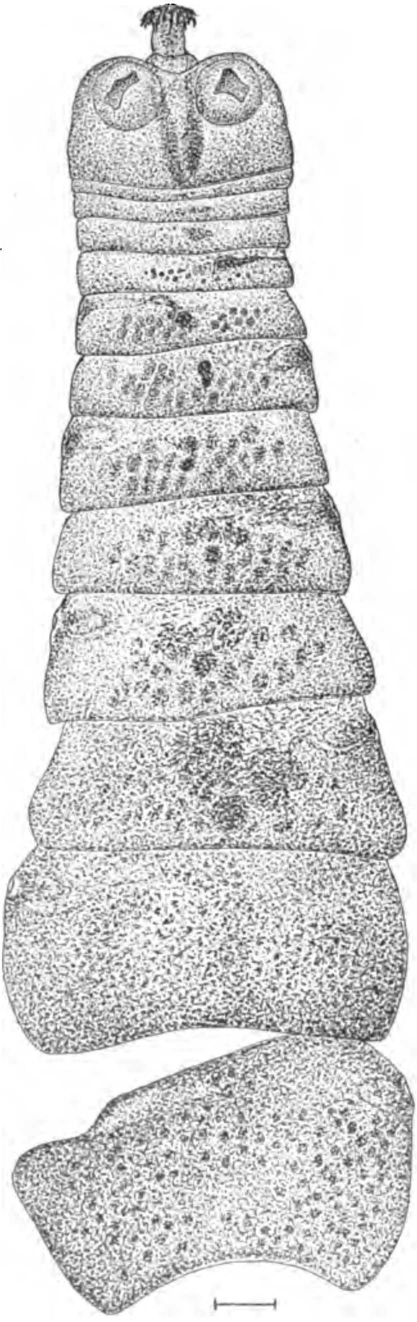


FIG. 9.—LIGA BRASILIENSIS: ENTIRE WORM.

The worms (fig. 9) possess from 12 to 15 segments, a number slightly less than that given by Fuhrmann, who writes that there are about 16 segments. A specimen with 12 segments measured 3 mm. in length by 0.7 mm. in width.

The head (fig. 9) is 200µ long by 400µ wide, with well-developed rostellum (fig. 10) armed with 20 hooks (fig. 11), arranged in a double crown of alternating longer and shorter hooks. The longer hooks measure 45 to 50µ in length which is practically the same size as that given by Fuhrmann. The hooks of the two rows are similar in shape and possess a long dorsal root and a short ventral root, the dorsal root and blade of the hook being about equal in length. Suckers 135µ (150µ Fuhrmann) in diameter. Segmentation begins immediately behind the head. The length of the segments gradually increases, and beginning with about the fifth segment an increase in width also takes place, the twelfth segment measuring 360µ long by 700µ wide. In still older segments the length may be greater than the width, 1 mm. and 0.6 mm., respectively. Parenchymatous tissue of the body very granular (from which apparently the name *punctata* of Weinland). Male organs become functional in sixth or seventh segment, female organs in ninth or tenth, uterus becomes functional in eleventh or twelfth segment. Genital pores regularly alternate in the anterior third of the segment. Male and female genital canals pass dorsal of excretory vessels and nerve.

Male reproductive organs.—Testicles (fig. 12, *t.*) about 18 (12–14 Fuhrmann) in number, oval, maximum size 80 to 100μ, located in the middle field of the posterior two-thirds of the segment, nine in each lateral half of the segment. Vas deferens (figs. 12, 13, *v. def.*) forms a mass of coils in the anterior third of the segment, beginning near the median line and extending outward nearly to the genital pore, and also describes a number of coils after entering the cirrus sac. No vesicular enlargements in any part of the vas deferens. Cirrus sac (figs. 12, 13, *c. p.*) oval, elongated, 80 to 100μ long by 40 to 55μ wide. Cirrus 40 to 50μ long, armed with highly refractile spines,

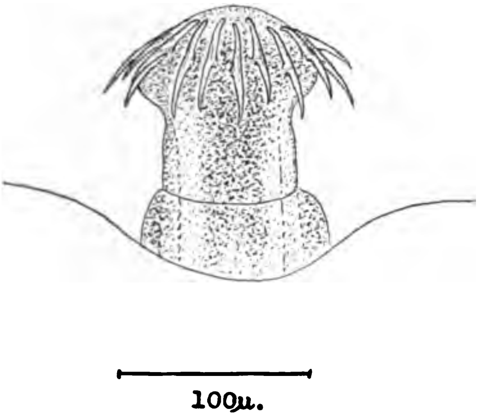


FIG. 10.—LIGA BRASILIENSIS: ROSTELLUM, EXTRUDED.

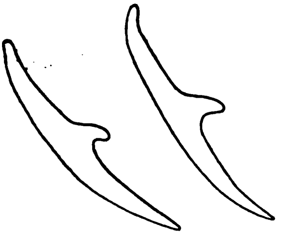


FIG. 11.—LIGA BRASILIENSIS: HOOKS FROM ROSTELLUM.

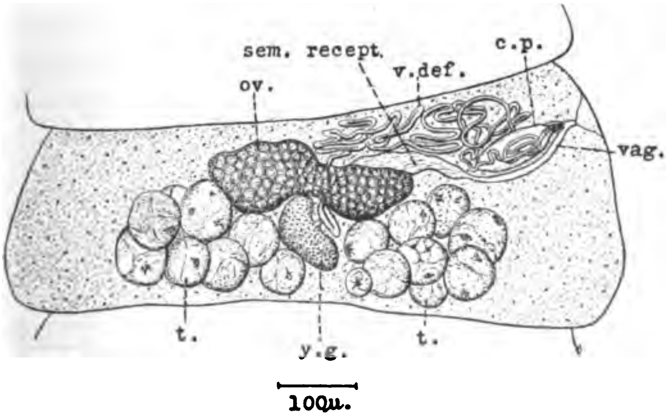


FIG. 12.—LIGA BRASILIENSIS: SEXUALLY MATURE SEGMENT. *c. p.*, CIRRUS POUCH. *ov.*, OVARY. *sem. recept.*, SEMINAL RECEPTACLE. *t.*, TESTICLES. *vag.*, VAGINA. *v. def.*, VAS DEFERENS. *y. g.*, YOLK GLAND.

which in stained specimens are deeply stained and form a conspicuous cone-shaped structure in the cirrus pouch or in the genital cloaca.

Female reproductive organs.—Vagina (figs. 12, 13, *vag.*) enlarged after crossing the excretory canals, to form a seminal receptacle (figs. 12, 13, *sem. recept.*), varying greatly in size in different segments. Ovary (fig. 12, *ov.*) in central portion of segment, sac-like, faintly bilobed, somewhat elongated transversely. Yolk gland (fig. 12, *y. g.*) about 100μ in diameter, nearly round, or reniform. Shell gland small, inconspicuous. Gravid uterus (fig. 13, *ut.*) consists of a thin-walled sac with many small, incompletely separated lobules or outpocketings, filling nearly the entire middle field of the segment excepting a small anterior portion occupied by the vas deferens. Eggs (fig. 14) with a thin outer shell with a tubular process at each

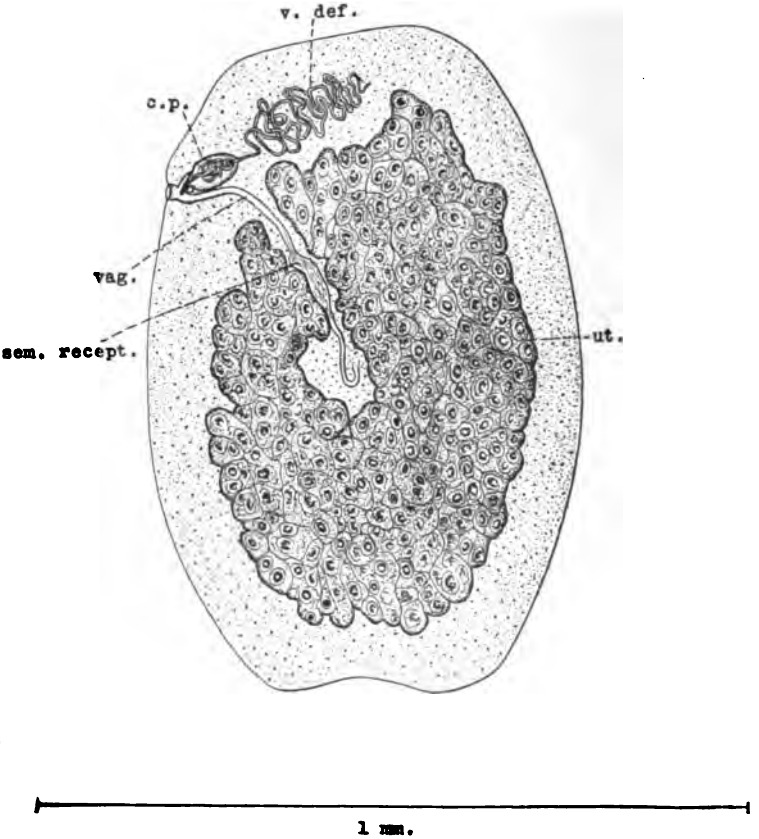


Fig. 13.—Liga brasiliensis: Gravid segment. *c. p.*, Cirrus pouch. *sem. recept.*, Seminal receptacle. *ut.*, Uterus. *vag.*, Vagina. *v. def.*, Vas deferens.

pole terminating in a small globular expansion. Length of outer shell, including processes, 120 to 125μ; central portion 50μ long by 38 to 40μ wide; diameter of tubular processes 3 to 4μ, of globular expansion 10 to 17μ. Inside of the outer shell a second thin, well-defined shell, spherical, 33 to 36μ in diameter. Oncosphere 26μ in diameter.

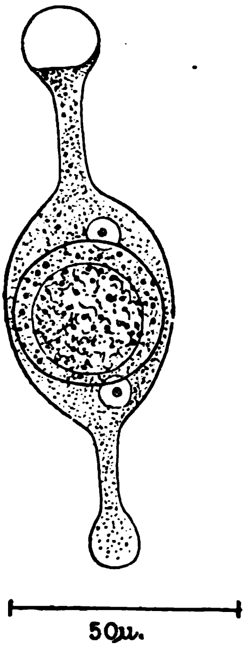


FIG. 14.—LIGA BRASILIENSIS: EGG.

Genus RHABDOMETRA Kholodkovski, 1906.

(For generic diagnosis see p. 86.)

RHABDOMETRA NULLICOLLIS, new species.

Figs. 15–22.

This species has been found in the sagecock (*Centrocercus urophasianus*) and in the sharp-tailed grouse (*Pedioecetes phasianellus columbianus*). The type-specimens (No. 6018, U. S. Nat. Mus.) were collected from the first-named host in Colorado.

External anatomy.

The various specimens of this species which have been studied measured 50 to 100 mm. in length by 2 to 2.5 mm. in maximum width. The head (figs. 15, 16) is obtusely pointed anteriorly, 560 to 650μ wide, about 360μ thick, and 280 to 330μ long, without rostellum. The suckers are 140 to 160μ in diameter. A neck is absent, segmentation beginning immediately behind the head. The segments are at first of the same width as the head, or slightly wider, and gradually increase in width, finally decreasing again at the posterior end of the strobila. The first segments are less than 20μ in length, sexually active segments measure 330μ in length by 1.25 mm. in width, the largest segments measure 1.25 mm. in length by 2 to 2.5 mm. in width, and the final segments 2.8 mm. in length by 1.3 mm. in width. The posterior border of each segment overlaps the anterior end of the following segment only very slightly, and is but slightly wider than the anterior border, so that the segments are nearly quadrate in shape.

The sexual pores are irregularly alternate, located in the anterior third of the segment.

Internal anatomy.

Nervous system.—The lateral longitudinal nerves (fig. 18, *l. n.*) are large and well developed, located in the lateral portions of the segment inside the inner layer of longitudinal muscles.

Musculature.—The longitudinal muscles (fig. 18) are arranged in numerous small bundles disposed in two layers close together, and a considerable distance from the surface of the segment. Dorsoventral fibers are numerous. Transverse fibers are comparatively few, in relation with the outer and inner sides of the inner longitudinal muscles which they cross at right angles.

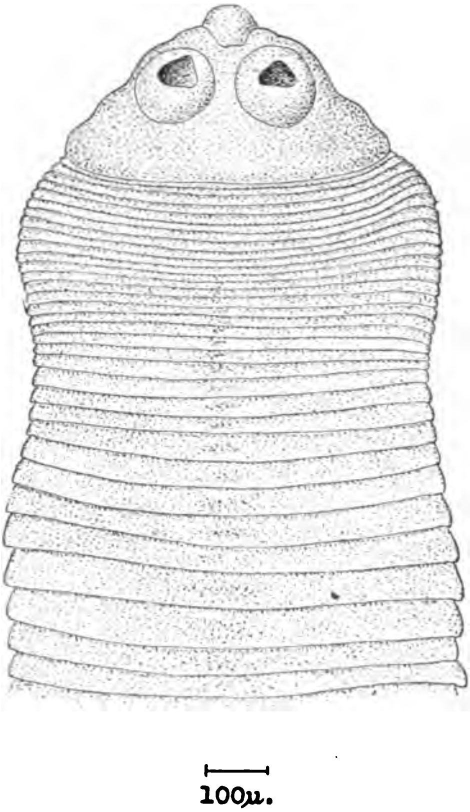


FIG. 15.—RHABDOMETRA NULLICOLLIS: HEAD AND ANTERIOR PORTION OF STROBILA.

Excretory system.—The excretory system is well developed. The dorsal (fig. 18, *d. ex.*) and ventral canals (fig. 18, *v. ex.*) are located a considerable distance mediad from the lateral nerves. The ventral canal is much the larger, measuring in places 80μ in diameter, whereas the dorsal canal measures less than 8μ. The ventral canals are connected by a transverse canal in the posterior portion of each segment, and also send off anastomosing branches which run among the various organs of the segment, and also form a plexus, which extends laterally on each side of the segment as far as the lateral longitudinal nerve. The vagina and cirrus pouch pass between the dorsal and ventral excretory canals and dorsal of the lateral nerve.

Male reproductive organs.—The testicles (figs. 17, 18, 20, *t.*) are about 60 in number, arranged in two layers in the middle field, in the posterior portion of the segment. They measure from 80 to 100μ in diameter when fully developed. The mass of testicles is hollowed out in front, and this depression is occupied by the female genital glands. The vas deferens (figs. 20, 21, *v. def.*) forms a mass of coils in the anterior third of the segment extending from the median line to the base of the cirrus pouch. The cirrus pouch (figs. 17, 19, 21, 22, *c. p.*) is elongated, broadest near the base and tapering toward its outer end. It measures 350 to 380μ in length by 80 to 100μ in thickness. It is covered with a layer of muscle fibers interlacing and crossing diagonally, forming a sort of basket work (fig. 19). In the distal three-fifths of the pouch this layer is very thick, but is thin in the proximal or basal portion of the pouch. The cirrus (figs. 19, 20, *cir.*) is from 250 to 350μ in length, about 10μ in diameter when evaginated, with a lumen about 2μ in diameter, and is armed with short spines 2 to 3μ long. A number of slender muscles, which extend from its inner end to attach to the distal portion of the pouch, serve as protractors. The portion of the vas deferens which lies within the cirrus pouch possesses a thick muscular wall. From the base of the cirrus pouch a prominent retractor muscle (fig. 19, *retr.*) extends diagonally inwards and forwards to the anterior end of the segment near the median line. The

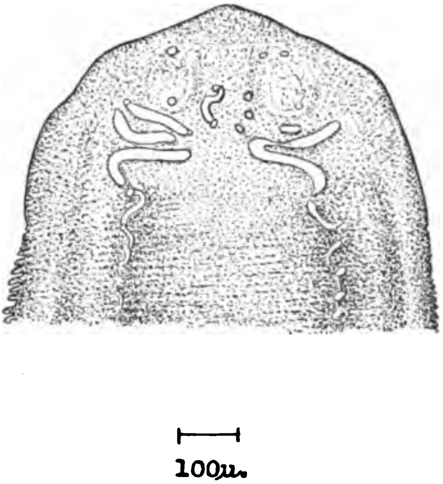


FIG. 16.—RHABDOMETRA NULLICOLLIS: HEAD AND ANTERIOR PORTION OF STROBILA, MEDIAN HORIZONTAL SECTION.

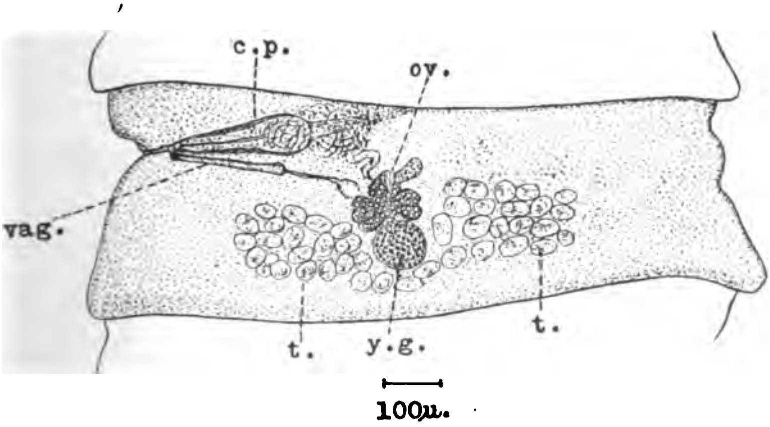


FIG. 17.—RHABDOMETRA NULLICOLLIS: SEXUALLY MATURE SEGMENT. *c. p.*, CIRRUS POUCH. *ov.*, OVARY. *t.*, TESTICLES. *vag.*, VAGINA. *y. g.*, YOLK GLAND.

axis of the cirrus pouch is nearly transverse in younger segments, with its inner end slightly tilted forward, but as the segments become older the cirrus pouch becomes more and more oblique.

*Female reproductive **organs**.*—The vagina (figs. 17, 18, 20, 21, 22, *vag.*), which opens into the genital sinus immediately behind the male opening, has three distinct portions. The first is very short with a narrow lumen and is surrounded by a spherical muscle bulb 25 to 30μ in diameter which serves as a sphincter (fig. 20, *sph. vag.*). The second portion is 250 to 300μ long, and possesses a muscular wall by the expansion or contraction of which the size of the lumen may be varied; this portion is lined with closely set cilia-like projections 8 to 10μ long. The third portion has a thin membranous wall, and its lumen is at first very narrow, about 2μ, but toward its inner end it swells out to form a seminal receptacle (figs. 18, 20, *sem. recept.*) about 50μ in diameter and 75 to 100μ long.

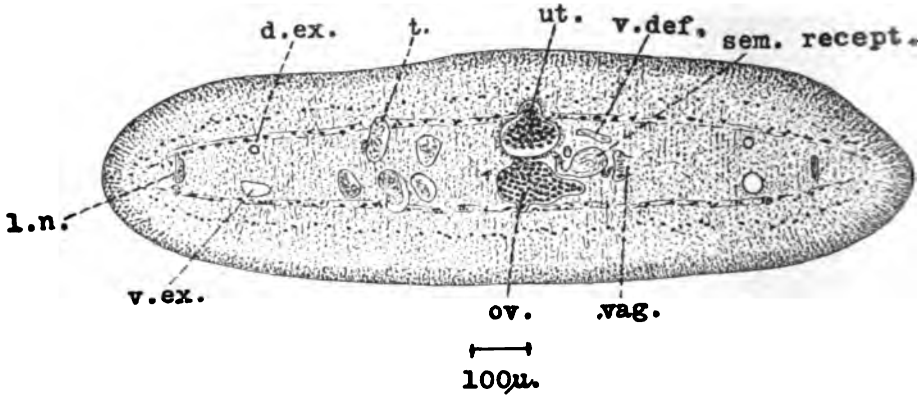


FIG. 18.—RHABDOMETRA NULLICOLLIS: SEXUALLY MATURE SEGMENT, TRANSVERSE SECTION. *d. ex.*, DORSAL EXCRETORY VESSEL. *l. m.*, NERVE CORD. *ov.*, OVARY. *sem. recept.*, SEMINAL RECEPTACLE. *t.*, TESTICLE. *ut.*, UTERUS. *vag.*, VAGINA. *v. def.*, VAS DEFERENS. *v. ex.*, VENTRAL EXCRETORY VESSEL.

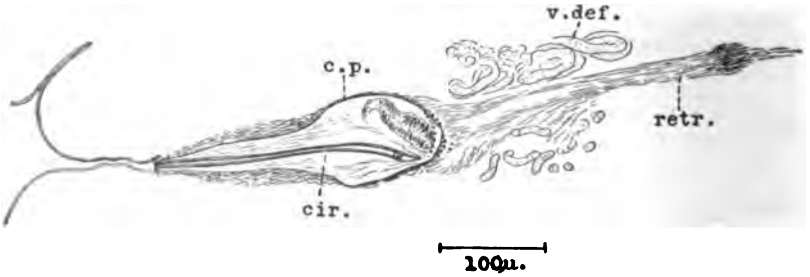


FIG. 19.—RHABDOMETRA NULLICOLLIS: SECTION THROUGH CIRRUS POUCH. *cir.*, CIRRUS. *c. p.*, CIRRUS POUCH. *retr.*, RETRACTOR OF CIRRUS POUCH. *v. def.*, VAS DEFERENS.

The ovary (figs. 17, 18, *ov.*) is small, compact, and but slightly lobed. At its maximum of development it does not exceed 175μ in width. It is located about in the center of the segment nearer the ventral than the dorsal surface, and in contact with the inner side of the inner longitudinal muscle layer. Immediately behind the ovary is the rounded yolk gland (fig. 17, *y. g.*) which measures 100 to 130μ in diameter. Dorsal of the yolk gland is the shell gland slightly smaller. The uterus (figs. 18, 20, 21, 22, *ut.*) develops immediately in front of and dorsal of the ovary, as a simple sac-like organ. As the uterus develops, growing anteriorly and posteriorly, the ovary disappears. The parenchyma in front of the uterus becomes dense and fibrous, and develops into a prominent para-

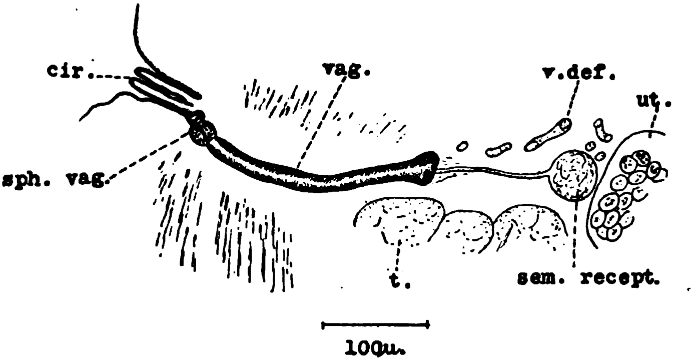


FIG. 20.—RHABDOMETRA NULLICOLLIS: SECTION THROUGH VAGINA, SEMINAL RECEPTACLE, AND EXTRUDED CIRRUS. *cir.*, CIRRUS. *sem. recept.*, SEMINAL RECEPTACLE. *sph. vag.*, SPHINCTER OF VAGINA. *t.*, TESTICLES. *ut.*, UTERUS. *vag.*, VAGINA. *v. def.*, VAS DEFERENS.

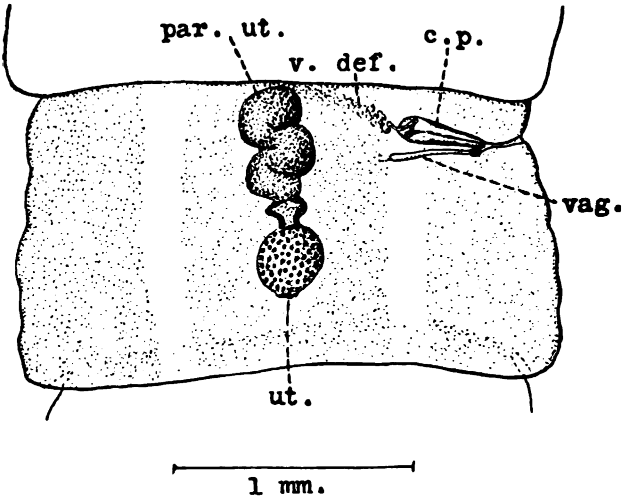


FIG. 21.—RHABDOMETRA NULLICOLLIS: GRAVID SEGMENT. *c. p.*, CIRRUS POUCH. *par. ut.*, PARA-UTERINE ORGAN. *ut.*, UTERUS. *vag.*, VAGINA. *v. def.*, VAS DEFERENS.

uterine organ (figs. 21, 22, *par. ut.*) which behind is in immediate relation with the anterior end of the uterus. The para-uterine organ when fully developed extends forward to the anterior end of the segment in a slightly tortuous course. Its wall is 5 to 10μ thick, composed in large part of muscular elements, and its cavity before the eggs pass forward into it from the uterus is filled with a finely fibrous mass. The eggs are oval, with a thin outer membrane 36 to 40μ in diameter, a thicker middle shell 24 to 27μ in diameter, and a thin inner membrane closely enveloping the oncosphere, which measures 18μ in diameter. When the eggs first enter the uterus they are surrounded by a single membrane, the others developing later.

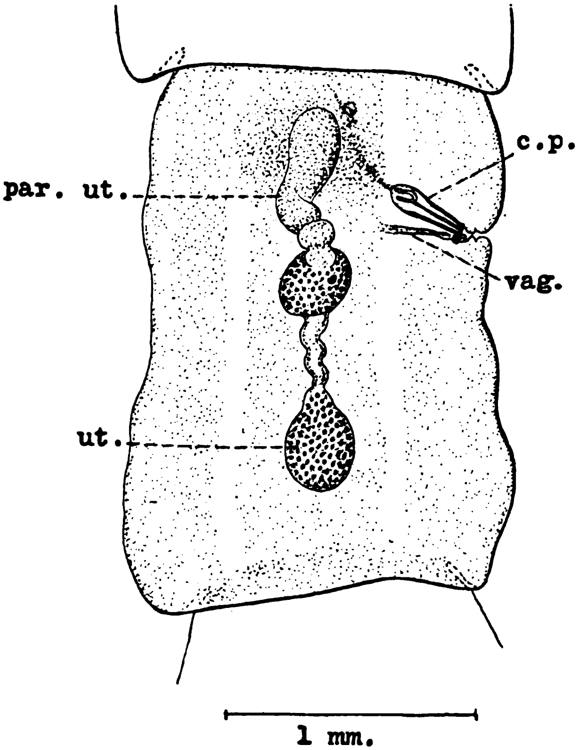


FIG. 22.—RHABDOMETRA NULLICOLLIS: GRAVID SEGMENT. *c. p.*, CIRRUS POUCH. *par. ut.*, PARA-UTERINE ORGAN. *ut.*, UTERUS. *vag.*, VAGINA.

RHABDOMETRA SIMILIS, new species.

Figs. 23–26.

This species is based on specimens (from the collection of H. B. Ward, deposited in the U. S. National Museum Helminthological Collection, No. 7236) collected from a rain crow (*Coccyzus americanus*) in Nebraska. No heads were present in this material, but the anatomy of the strobila shows the affinities of this species with the genus *Rhabdometra*.

External anatomy.

The length of this species, so far as could be judged from the specimens examined, which were broken into small pieces, is about 75 mm. The maximum breadth of the strobila is 1.5 mm. The first segments are very short (80 μ) and about 0.5 mm. broad, the oldest segments slightly longer than broad, 0.95 to 1 mm. long by 0.85 to 0.95 mm. broad. The posterior border of each segment overlaps the anterior portion of the following segment only very slightly. The segments are nearly as broad at the anterior border as at the posterior border and are hence nearly quadrate in shape.

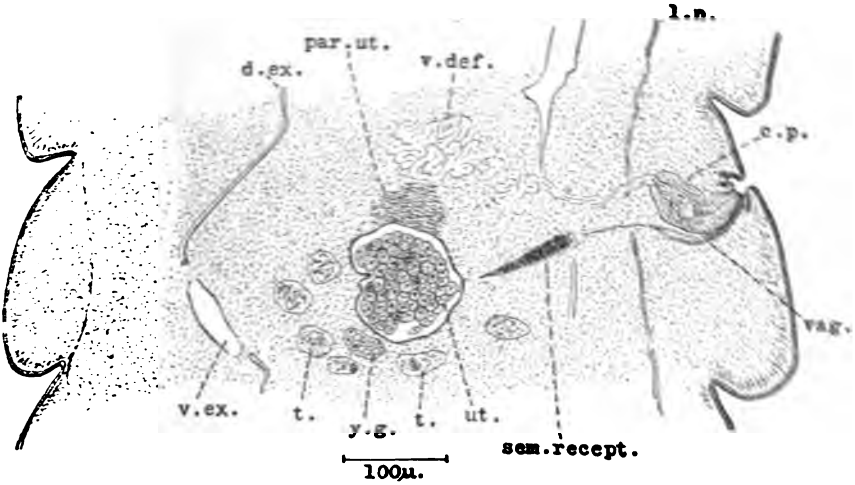


FIG. 23.—RHABDOMETRA SIMILIS: SEXUALLY MATURE SEGMENT BECOMING GRAVID, HORIZONTAL SECTION. *c. p.*, CIRRUS POUCH. *d. ex.*, DORSAL EXCRETORY VESSEL. *l. n.*, NERVE CORD. *par. ut.*, PARA-UTERINE ORGAN. *sem. recept.*, SEMINAL RECEPTACLE. *t.*, TESTICLES. *ut.*, UTERUS. *vag.*, VAGINA. *v. def.*, VAS DEFERENS. *v. ex.*, VENTRAL EXCRETORY VESSEL. *y. g.*, YOLK GLAND.

The genital pores are irregularly alternate, located in the anterior half of each segment.

Internal anatomy.

Nervous system.—The usual lateral longitudinal nerves (fig. 24, *l. n.*) are present and are located a short distance beyond the most lateral bundles of the inner longitudinal muscle layer, and inside of the outer longitudinal layer, about equidistant from the lateral border of the segment and the longitudinal excretory canals.

Musculature.—The longitudinal muscles are arranged in two layers, an outer layer of numerous small bundles and an inner layer of larger bundles which are far apart and not over 20 to 24 in number.

Dorso-ventral fibers are fairly numerous throughout the segment, but transverse fibers are not present.

Excretory system (figs. 23, 24, *d. ex.*, *v. ex.*).—In sexually active segments the ventral excretory canals measure from 25 to 50μ in diameter, the dorsal canals 8 to 10μ. The latter are located dorsal of the ventral canals in about the same vertical longitudinal plane. In the posterior portion of each segment the ventral canals are connected by a transverse canal.

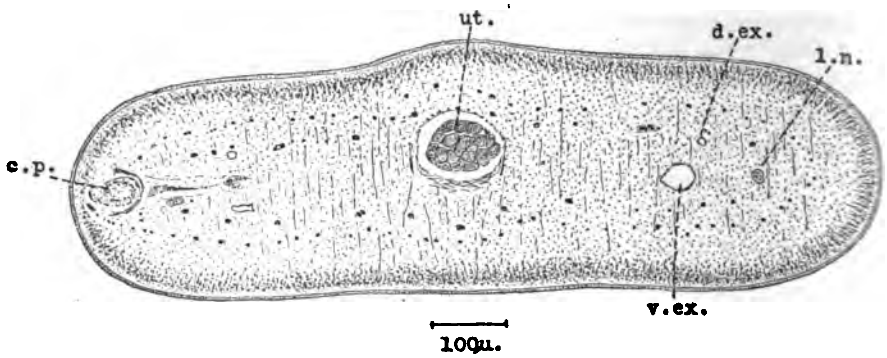


FIG. 24.—RHABDOMETRA SIMILIS: SEXUALLY MATURE SEGMENT, BECOMING GRAVID, TRANSVERSE SECTION. *c. p.*, CIRRUS POUCH. *d. ex.*, DORSAL EXCRETORY VESSEL. *l. n.*, NERVE CORD. *ut.*, UTERUS. *v. ex.*, VENTRAL EXCRETORY VESSEL.

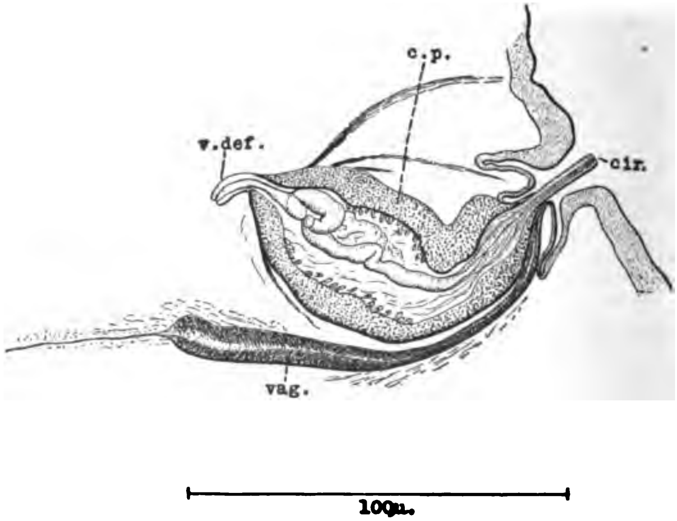


FIG. 25.—RHABDOMETRA SIMILIS: SECTION THROUGH CIRRUS POUCH AND VAGINA. *cir.*, CIRRUS. *c. p.*, CIRRUS POUCH. *vag.*, VAGINA. *v. def.*, VAS DEFERENS.

The vagina and vas deferens pass between the excretory canals and dorsal of the lateral nerve.

Male reproductive organs.—The testicles (fig. 23, *t.*), numbering 16 to 20, are located in the posterior third of the segment, are oval in shape, and measure about 50μ in diameter. The vas deferens (fig. 23, *v. def.*), formed by the junction of efferent canals from the testicles, extends forward near the median line to the anterior end of the segment, then turns and passes outward and backward in a tortuous course toward the cirrus pouch. The cirrus pouch (figs. 23, 24, 25, *c. p.*) is comparatively small, measuring but 80 to 90μ in length by 40μ in diameter. The outer muscular wall is rather thick (8 to 10μ) compared to the size of the pouch. The cirrus pouch is not supplied with a retractor muscle, but numerous muscle fibers extend from the base of the pouch outward to attach to the cuticula surrounding the genital pore. The cirrus (fig. 25, *cir.*) in the retracted condition is very slender (2μ) and is apparently without spines. When evaginated it measures about 4μ in diameter.

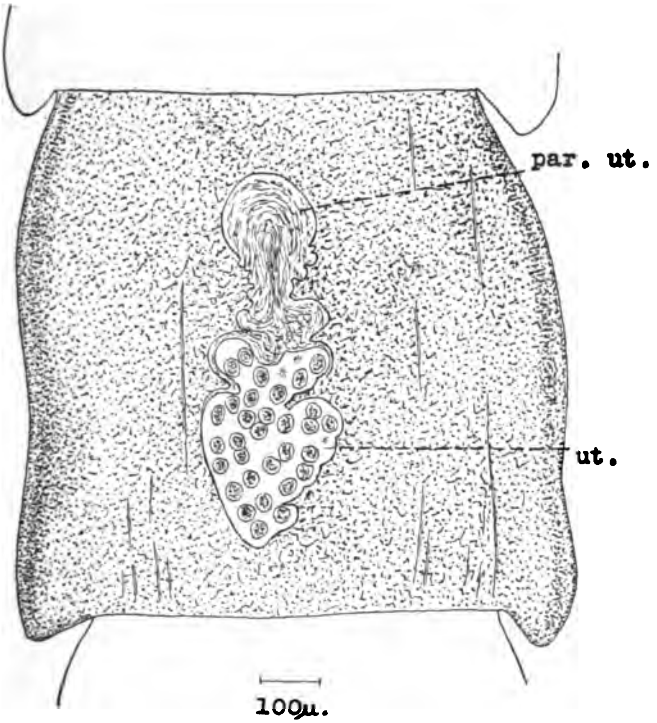


FIG. 26.—RHABDOMETRA SIMILIS: GRAVID SEGMENT. *par. ut.*, PARA-UTERINE ORGAN. *ut.*, UTERUS.

Female reproductive organs.—The vagina (figs. 23, 25, *vag.*), which opens into the genital cloaca immediately behind the cirrus, is at first rather thick-walled. It has no definite sphincter. Before crossing the lateral nerve the vagina becomes a thin-walled tube with narrow lumen, and after passing the excretory canals is dilated to form an elongated seminal receptacle (fig. 23, *sem. recept.*) which extends first inward toward the median line, and then diagonally backward and inward toward the female glands, which are located in the median line close to the posterior border of the segment.

The ovary, which is very small and compact, measures about 100μ in diameter and is near the median line in the ventral half of the segment near the posterior border. Ventral of the ovary is the yolk gland, about 80μ in diameter. A definite shell gland was not seen.

The uterus (figs. 23, 24, 26, *ut.*) develops immediately in front of the ovary in the median line. It is a simple sac-like organ slightly irregular but somewhat spherical in shape. In front of the uterus the parenchyma becomes modified to form a para-uterine organ (fig. 26, *par. ut.*) with bulbous anterior end, which extends forward in the median line nearly to the anterior border of the segment. The contents of this organ before the eggs have entered it present the usual fibrous appearance.

The eggs, which are oval in shape, have three membranes, an outer one, very thin, about 45μ in diameter, a thicker prominent middle membrane 30 to 38μ in diameter, and a thin inner membrane closely investing the oncosphere, which measures 25 to 30μ in diameter.

Genus ANONCHOTÆNIA Cohn, 1900.

(For generic diagnosis, see p. 86.)

ANONCHOTÆNIA GLOBATA (Linstow, 1879).

Fig. 27.

Some specimens of tapeworms (No. 3027, Helminthological Collection, Bureau of Animal Industry) collected in Maryland from *Dendroica striata* and others (No. 5955, Helminthological Collection, U. S. Nat. Mus.) collected in Maryland from *Melospiza melodia* agree very closely with the published descriptions of *Anonchotænia globata*, and I have accordingly identified them as belonging to this species.

External anatomy.

The length of these specimens is from 20 to 30 mm., and the maximum breadth is about 1 mm. The head is rounded, without rostellum, and measures 500 to 650μ in diameter. The suckers are about 230μ in diameter. Cohn (1901b) states that a neck is absent, segmentation beginning immediately behind the head. In the specimens which I have examined, however, there is an unsegmented region immediately behind the head measuring 0.6 mm. in width by 1.5 to 2 mm. in length. Fuhrmann (1908c, p. 625) has also noted that the neck is relatively long. The first segments are very short; the final segments nearly as long as broad. The genital pores are irregularly alternate at about the middle of the segment. The genital sinus is deep and narrow.

Internal anatomy.

The ventral excretory canals are connected in the posterior portion of each segment by a transverse canal.

The longitudinal muscles are arranged in two concentric layers, the inner layer (*int. musc.*) consisting of about 50 bundles, the outer (*ext. musc.*) of more numerous smaller bundles. Well-defined transverse fibers are present just inside the inner longitudinal layer. Dorso-ventral fibers are very weakly developed.

The sexual canals pass on the ventral side of the excretory vessels and the nerve.

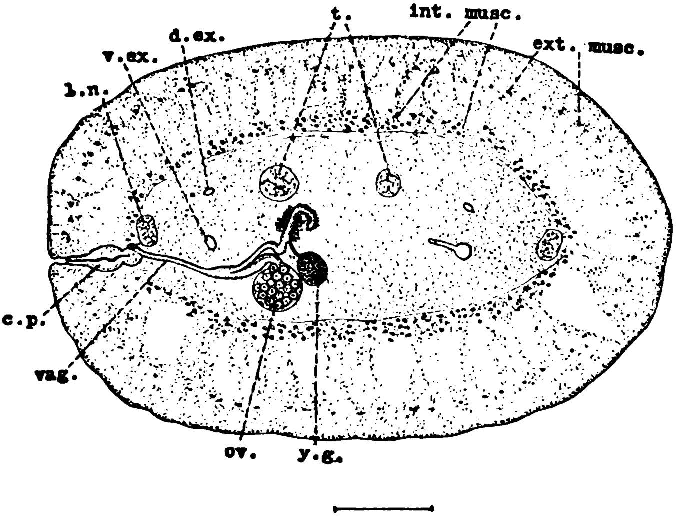


FIG. 27.—ANONCHOTÆNIA GLOBATA: SEXUALLY MATURE SEGMENT, TRANSVERSE SECTION. *c. p.*, CIRRUS POUCH. *d. ex.*, DORSAL EXCRETORY VESSEL. *ext. musc.*, OUTER LONGITUDINAL MUSCLES. *int. musc.*, INNER LONGITUDINAL MUSCLES. *l. n.*, NERVE CORDS. *ov.*, OVARY. *t.*, TESTICLES. *vag.*, VAGINA. *v. ex.*, VENTRAL EXCRETORY VESSEL. *y. g.*, YOLK GLAND.

Male reproductive organs.—The testicles (*t.*) are five in number located toward the dorsal surface in the anterior portion of the segment. They measure when fully developed 30 to 40μ in diameter. The vas deferens is somewhat tortuous, without, however, forming a mass of coils, and is without vesicular enlargements. The cirrus pouch (*c. p.*) broadest at the base and tapering toward the end, measures from 70 to 80μ in length by 25μ in diameter. Cohn describes the cirrus pouch as short, club-shaped, and "recht muskulös." In my specimens the outer wall of the pouch is thin, with weakly developed musculature.

Internal anatomy.

Nervous system.—The lateral longitudinal nerves (fig. 18, *l. n.*) are large and well developed, located in the lateral portions of the segment inside the inner layer of longitudinal muscles.

Musculature.—The longitudinal muscles (fig. 18) are arranged in numerous small bundles disposed in two layers close together, and a considerable distance from the surface of the segment. Dorsoventral fibers are numerous. Transverse fibers are comparatively few, in relation with the outer and inner sides of the inner longitudinal muscles which they cross at right angles.

Excretory system.—The excretory system is well developed. The dorsal (fig. 18, *d. ex.*) and ventral canals (fig. 18, *v. ex.*) are located a considerable distance mediad from the lateral nerves. The ventral canal is much the larger, measuring in places 80μ in diameter, whereas the dorsal canal measures less than 8μ. The ventral canals are connected by a transverse canal in the posterior portion of each segment, and also send off anastomosing branches which run among the various organs of the segment, and also form a plexus, which extends laterally on each side of the segment as far as the lateral longitudinal nerve.

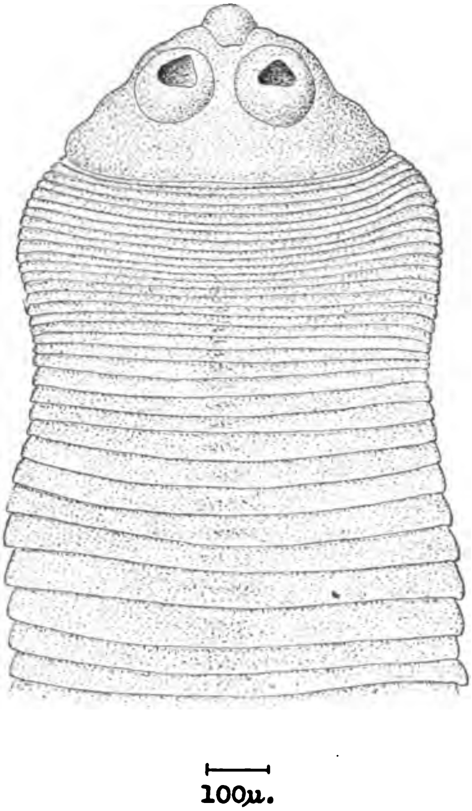


FIG. 15.—RHABDOMETRA NULLICOLLIS: HEAD AND ANTERIOR PORTION OF STROBILA.

The vagina and cirrus pouch pass between the dorsal and ventral excretory canals and dorsal of the lateral nerve.

Male reproductive organs.—The testicles (figs. 17, 18, 20, *t.*) are about 60 in number, arranged in two layers in the middle field, in the posterior portion of the segment. They measure from 80 to 100μ in diameter when fully developed. The mass of testicles is hollowed out in front, and this depression is occupied by the female genital glands. The vas deferens (figs. 20, 21, *v. def.*) forms a mass of coils in the anterior third of the segment extending from the median line to the base of the cirrus pouch. The cirrus pouch (figs. 17, 19, 21, 22, *c. p.*) is elongated, broadest near the base and tapering toward its outer end. It measures 350 to 380µ in length by 80 to 100µ in thickness. It is covered with a layer of muscle fibers interlacing and crossing diagonally, forming a sort of basket work (fig. 19). In the distal three-fifths of the pouch this layer is very thick, but is thin in the proximal or basal portion of the pouch. The cirrus (figs. 19, 20, *cir.*) is from 250 to 350µ in length, about 10µ in diameter when evaginated, with a lumen about 2µ in diameter, and is armed with short spines 2 to 3µ long. A number of slender muscles, which extend from its inner end to attach to the distal portion of the pouch, serve as protractors. The portion of the vas deferens which lies within the cirrus pouch possesses a thick muscular wall. From the base of the cirrus pouch a prominent retractor muscle (fig. 19, *retr.*) extends diagonally inwards and forwards to the anterior end of the segment near the median line. The

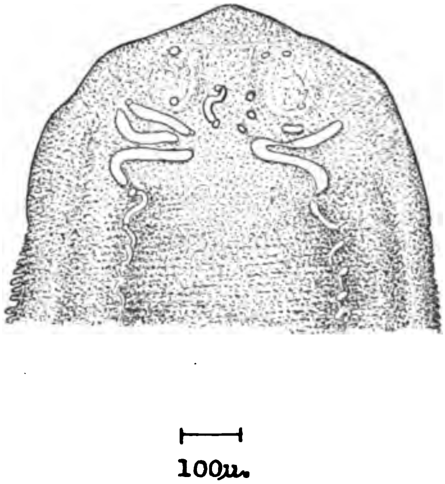


FIG. 16.—RHABDOMETRA NULLICOLLIS: HEAD AND ANTERIOR PORTION OF STROBILA, MEDIAN HORIZONTAL SECTION.

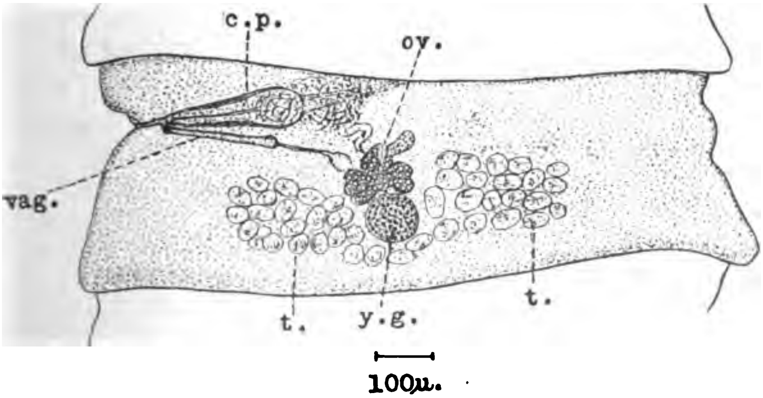


FIG. 17.—RHABDOMETRA NULLICOLLIS: SEXUALLY MATURE SEGMENT. *c. p.*, CIRRUS POUCH. *ov.*, OVARY. *t.*, TESTICLES. *vag.*, VAGINA. *y. g.*, YOLK GLAND.

axis of the cirrus pouch is nearly transverse in younger segments, with its inner end slightly tilted forward, but as the segments become older the cirrus pouch becomes more and more oblique.

Female reproductive organs.—The vagina (figs. 17, 18, 20, 21, 22, *vag.*), which opens into the genital sinus immediately behind the male opening, has three distinct portions. The first is very short with a narrow lumen and is surrounded by a spherical muscle bulb 25 to 30μ in diameter which serves as a sphincter (fig. 20, *sph. vag.*). The second portion is 250 to 300μ long, and possesses a muscular wall by the expansion or contraction of which the size of the lumen may be varied; this portion is lined with closely set cilia-like projections 8 to 10μ long. The third portion has a thin membranous wall, and its lumen is at first very narrow, about 2μ, but toward its inner end it swells out to form a seminal receptacle (figs. 18, 20, *sem. recept.*) about 50μ in diameter and 75 to 100μ long.

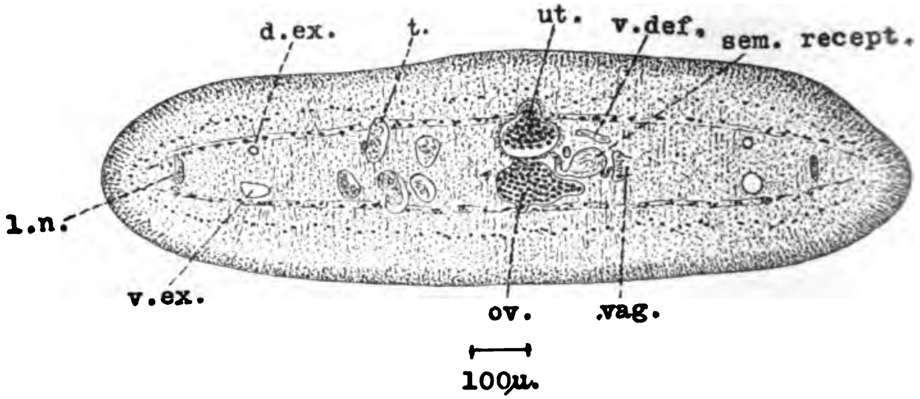


FIG. 18.—RHABDOMETRA NULLICOLLIS: SEXUALLY MATURE SEGMENT, TRANSVERSE SECTION. *d. ex.*, DORSAL EXCRETORY VESSEL. *l. m.*, NERVE CORD. *ov.*, OVARY. *sem. recept.*, SEMINAL RECEPTACLE. *t.*, TESTICLE. *ut.*, UTERUS. *vag.*, VAGINA. *v. def.*, VAS DEFERENS. *v. ex.*, VENTRAL EXCRETORY VESSEL.

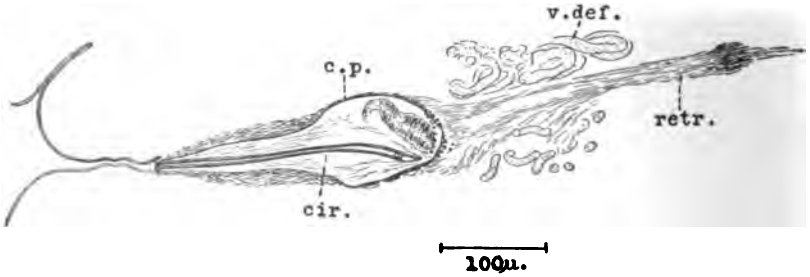


FIG. 19.—RHABDOMETRA NULLICOLLIS: SECTION THROUGH CIRRUS POUCH. *cir.*, CIRRUS. *c. p.*, CIRRUS POUCH. *retr.*, RETRACTOR OF CIRRUS POUCH. *v. def.*, VAS DEFERENS.

The ovary (figs. 17, 18, *ov.*) is small, compact, and but slightly lobed. At its maximum of development it does not exceed 175μ

in width. It is located about in the center of the segment nearer the ventral than the dorsal surface, and in contact with the inner side of the inner longitudinal muscle layer. Immediately behind the ovary is the rounded yolk gland (fig. 17, *y. g.*) which measures 100 to 130μ in diameter. Dorsal of the yolk gland is the shell gland slightly smaller. The uterus (figs. 18, 20, 21, 22, *ut.*) develops immediately in front of and dorsal of the ovary, as a simple sac-like organ. As the uterus develops, growing anteriorly and posteriorly, the ovary disappears. The parenchyma in front of the uterus becomes dense and fibrous, and develops into a prominent para-

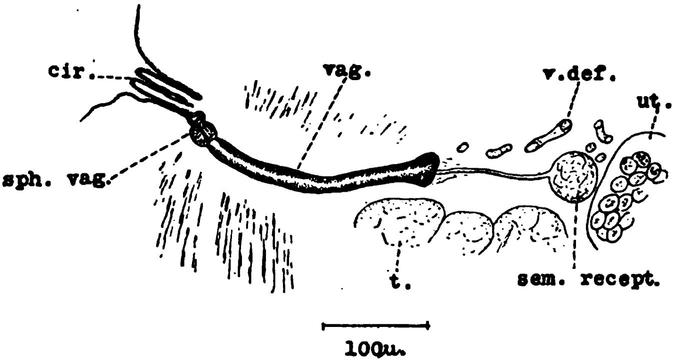


FIG. 20.—RHABDOMETRA NULLICOLLIS: SECTION THROUGH VAGINA, SEMINAL RECEPTACLE, AND EXTRUDED CIRRUS. *cir.*, CIRRUS. *sem. recept.*, SEMINAL RECEPTACLE. *sph. vag.*, SPHINCTER OF VAGINA. *t.*, TESTICLES. *ut.*, UTERUS. *vag.*, VAGINA. *v. def.*, VAS DEFERENS.

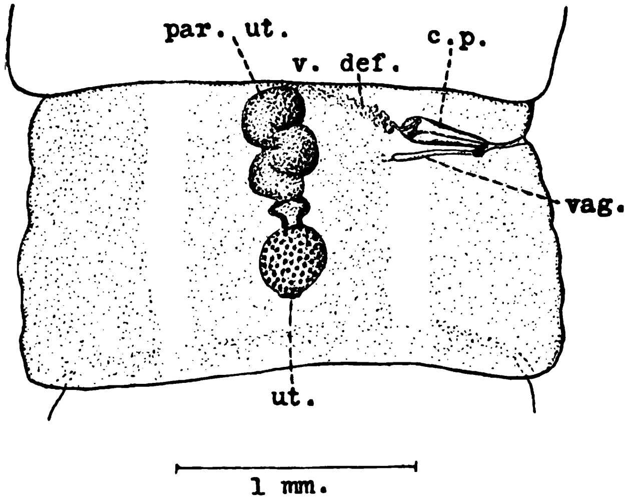


FIG. 21.—RHABDOMETRA NULLICOLLIS: GRAVID SEGMENT. *c. p.*, CIRRUS POUCH. *par. ut.*, PARA-UTERINE ORGAN. *ut.*, UTERUS. *vag.*, VAGINA. *v. def.*, VAS DEFERENS.

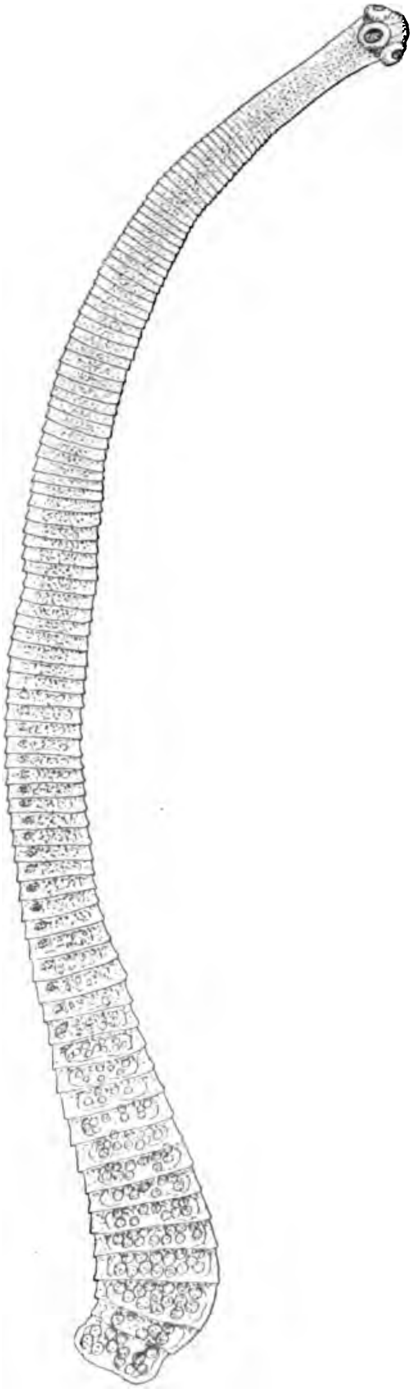


FIG. 28.—HYMENOLEPIS CANTANIANA: ENTIRE WORM. × 60.

2.5 mm. behind the head in which the male organs had just reached the functional stage measured 30μ in length by 120μ in width.

The genital pores are unilateral on the right-hand margin of the strobila, located slightly in front of the middle of each segment.

Internal anatomy.

The cirrus pouch and seminal vesicle are dorsal of the excretory vessels.

Male reproductive organs.—The testicles are three in number, dorsally located one on the right-hand side and two on the left-hand side of the segment. They reach a maximum size of 25μ in diameter. A seminal vesicle is present in the anterior portion of the segment near the median line; it attains a size of 25 to 45μ in diameter.

The cirrus pouch is elongated, tapering toward its outer end, and measures 75 to 95μ in length by 12 to 18μ in diameter. Its inner end is near the anterior border of the segment and extends beyond the median line in the younger segments. The outer wall of the pouch is thin without definite muscle elements. Within the pouch the vas deferens is enlarged to form a seminal reservoir, which occupies more or less of the cavity of the pouch.

Female reproductive organs.—In sexually mature segments the vagina is swollen to form a prominent seminal receptacle located near the right-hand border of the segment ventral of the cirrus pouch, oval in shape, and attaining a maximum of 30 to 35μ by 45 to 50μ in width and length.

The ovary when fully developed is transversely elongated, extending laterally as far as the excretory canals and measuring 135μ in its longest dimension. It extends forward to the anterior border of the segment, but does not reach the posterior border. In the median line behind the ovary is the small rounded yolk gland, which measures about 20μ in diameter.

The uterus develops as a simple sac on the ventral side of the ovary, and the latter rapidly degenerates after the appearance of the former. When fully developed the uterus occupies practically the entire segment, and as its wall becomes folded inward in various places its cavity is divided into a number of incompletely separated chambers. The number of eggs in the gravid segment is small, 18 to 20, but on account of the large size which they finally attain the cavity of the uterus is fully occupied.

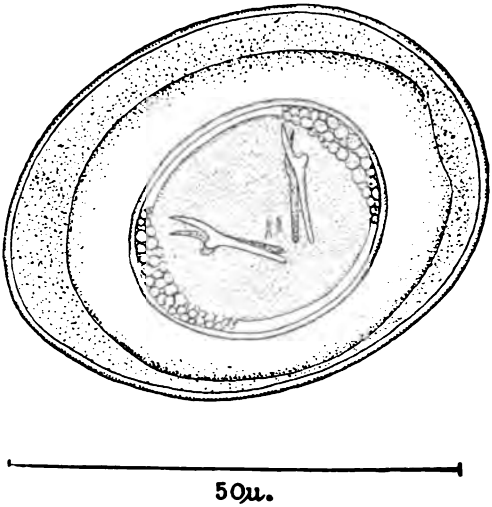


FIG. 29.—HYMENOLEPIS CANTANIANA: EGG.

When they first enter the uterus the eggs have but a single thin membrane and measure but 20μ in diameter. Later other membranes are developed, and the egg (fig. 29) in the final stage of development possesses two well-defined shells, an inner one 27 to 35μ in diameter and an outer one 45 to 60μ in diameter. Between the outer and inner shell is an intermediate finely granular layer limited by a very thin membrane internally and externally. The oncosphere measures 22 to 25μ in diameter with hooks 13 to 14μ in length.

Genus DIORCHIS Clerc, 1903.

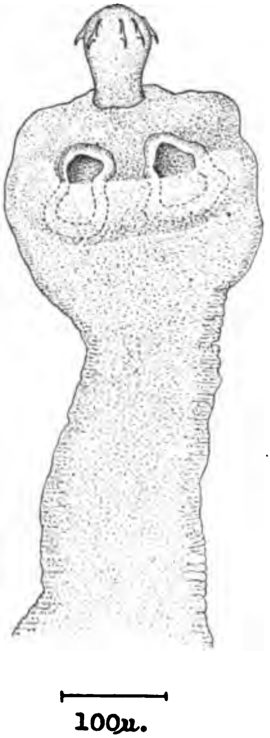
(For generic diagnosis see p. 98.)

DIORCHIS ACUMINATA (Clerc, 1902) Clerc, 1903.

Figs. 30–36.

Drepanidotænia acuminata CLERC, 1902a, p. 659, figs. 3, 4.
Diorchis acuminata (CLERC, 1902) CLERC, 1903, pp. 248, 249, 255, 281–284, pl. 8, fig. 13; pl. 9, fig. 25; pl. 11, figs. 78, 79.
Diorchis accuminata CLERC, 1903, p. 249 (misprint for *D. acuminata*).
Tænia acuminata CLERC, 1903, p. 283

Specimens of a tapeworm (from the collection of H. B. Ward, deposited in the U. S. National Museum Helminthological Collection, No. 7237) collected in Nebraska from *Fulica americana* apparently belong to the species *Diorchis acuminata.*



100µ.

FIG. 30.—DIORCHIS ACUMINATA: HEAD AND ANTERIOR PORTION OF STROBILA.

External anatomy.

These specimens measure 35 mm. in length by 0.65 mm. in maximum breadth. The final segments were not yet gravid, and it is consequently evident that the full-grown worm may be considerably larger than indicated by the above figures.

The head (figs. 30, 31) measures 160µ in length by 225 to 235µ in width. The rostellum is cylindrical when protruded, slightly broader at the tip than at the base, measuring 100µ in length by 50µ in diameter at the base and 70µ in diameter at the tip. It is armed with 10 hooks (fig. 32), with long dorsal and short ventral root and measuring 38µ in length, the dorsal root being 25µ and the prong 13µ in length. The suckers are about 80µ in diameter and are armed with minute spines less than 5µ in length, set close together in diagonal rows covering the entire surface of the sucker.

Segmentation begins very close behind the head, and in this region the strobila is of about the same breadth as the head. The breadth then becomes reduced to about 150µ and afterwards gradually increases throughout the remainder of the strobila. The segments are broader than long, the largest measuring 80µ in length by 650µ in width.

The genital pores are unilateral. In each segment the pore is located near the middle of the right-hand margin.

Internal anatomy.

Nervous system.—The lateral longitudinal nerves (fig. 34, *l. n.*) are about midway between the lateral borders of the segment and the excretory vessels.

Musculature.—The longitudinal muscles are arranged in two layers. The outer layer (fig. 34, *ext. musc.*) is composed of numerous small bundles of fibers close to the surface of the segment. The inner layer (fig. 34, *int. musc.*) consists of eight bundles, as a rule somewhat larger than the outer bundles, and conspicuous only in young segments.

Transverse muscle fibers are well developed only at the junction of the segments. The dorso-ventral fibers are very weakly developed.

Excretory system.—The longitudinal excretory vessels (figs. 34, *v. ex.*, *d. ex.*; 35, *v. ex.*) in the older segments are located near the ventral surface on the right-hand (pore) side of the segment and near the dorsal surface on the left-hand side. The dorsal vessel is close to and dorsal of the ventral vessel. The ventral vessels are not connected by transverse vessels.

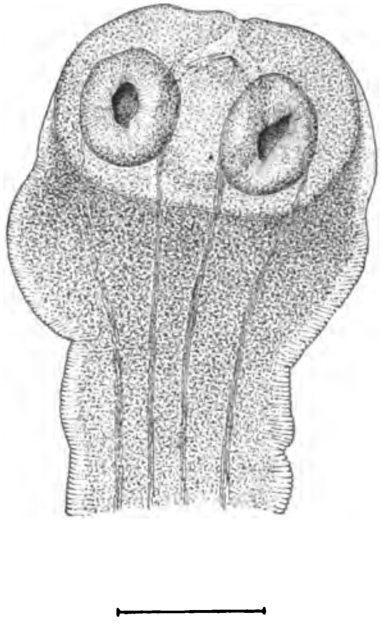


FIG. 31.—DIORCHIS ACUMINATA: HEAD WITH RETRACTED ROSTELLUM.

The cirrus pouch and vagina pass dorsal of the nerve and excretory vessels.

Male reproductive organs.—The testicles (fig. 33, *t.*) are two in number, located near the dorsal surface in the posterior portion of the segment, one on either side of the median line, and reach a maximum size of 100 to 130μ. A portion of the vas deferens is swollen to form a seminal vesicle (figs. 33, 34, *ves. sem.*), which attains a size of 80 to 130μ in diameter. This seminal vesicle is located in the median line close to the anterior border of the segment near the dorsal surface.

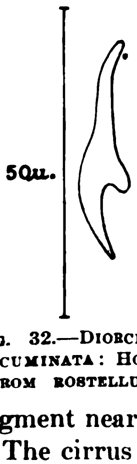


FIG. 32.—DIORCHIS ACUMINATA: HOOK FROM ROSTELLUM.

The cirrus pouch (figs. 33, 34, *c. p.*) is elongated, extending transversely across the segment. As a rule its inner end does not reach [illegible] in

[illegible] longitudinal

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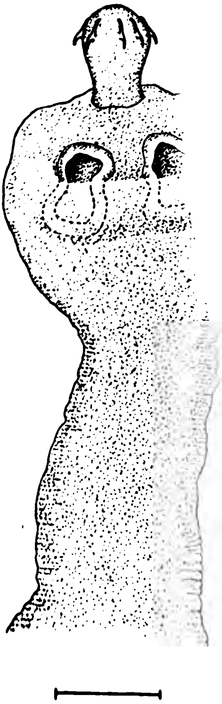

Fig. 30.—Diorchis acuminata: Head and anterior portion of strobila.

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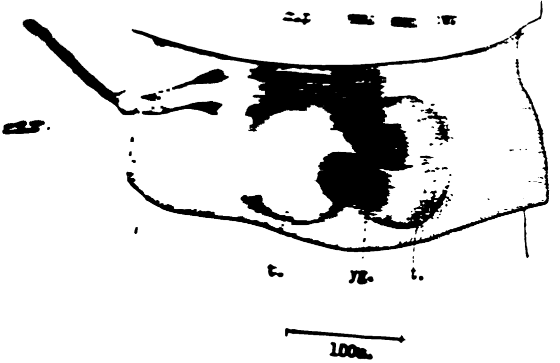
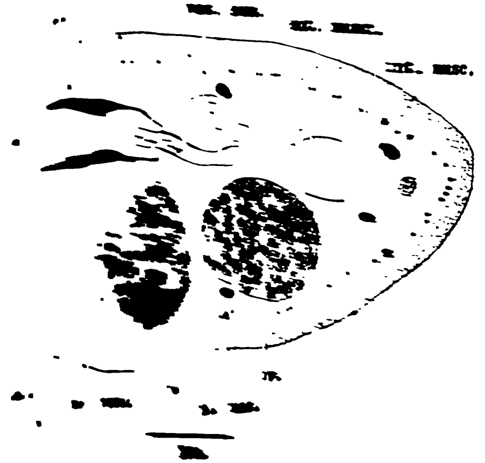
the largest measuring 80μ



[illegible] MATURE SEGMENT. [illegible]

[illegible] When the [illegible] deferens is [illegible] of the [illegible] to the [illegible] con-



[illegible] TRANSVERSE SECTION. [illegible]

[illegible] named; when everted it [illegible] swelling at its [illegible] measure over [illegible] long as broad. The genital pores are irregularly alternate at about the middle of the segment. The genital sinus is deep and narrow.

Internal anatomy.

The ventral excretory canals are connected in the posterior portion of each segment by a transverse canal.

The longitudinal muscles are arranged in two concentric layers, the inner layer (*int. musc.*) consisting of about 50 bundles, the outer (*ext. musc.*) of more numerous smaller bundles. Well-defined transverse fibers are present just inside the inner longitudinal layer. Dorso-ventral fibers are very weakly developed.

The sexual canals pass on the ventral side of the excretory vessels and the nerve.

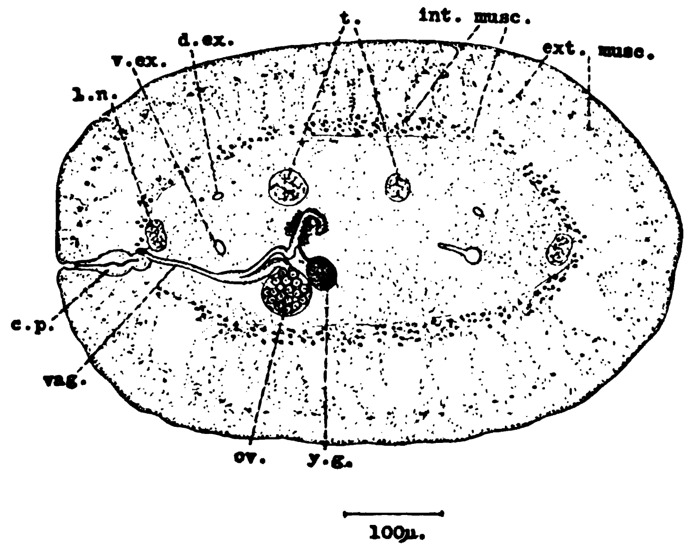


FIG. 27.—ANONCHOTÆNIA GLOBATA: SEXUALLY MATURE SEGMENT, TRANSVERSE SECTION. *c. p.*, CIRRUS POUCH. *d. ex.*, DORSAL EXCRETORY VESSEL. *ext. musc.*, OUTER LONGITUDINAL MUSCLES. *int. musc.*, INNER LONGITUDINAL MUSCLES. *l. n.*, NERVE CORDS. *ov.*, OVARY. *t.*, TESTICLES. *vag.*, VAGINA. *v. ex.*, VENTRAL EXCRETORY VESSEL. *y. g.*, YOLK GLAND.

Male reproductive organs.—The testicles (*t.*) are five in number located toward the dorsal surface in the anterior portion of the segment. They measure when fully developed 30 to 40μ in diameter. The vas deferens is somewhat tortuous, without, however, forming a mass of coils, and is without vesicular enlargements. The cirrus pouch (*c. p.*) broadest at the base and tapering toward the end, measures from 70 to 80μ in length by 25μ in diameter. Cohn describes the cirrus pouch as short, club-shaped, and "recht muskulös." In my specimens the outer wall of the pouch is thin, with weakly developed musculature.

Female reproductive organs.—The vagina (*vag.*) passes inward parallel with the cirrus pouch, and in older segments after crossing the excretory canals dilates to form a small seminal receptacle.

The yolk gland (*y. g.*) is spherical about 40μ in diameter located in the posterior part of the segment about in the median line. The ovary (*ov.*) is a simple sac-like organ, spherical in shape, about [illegible] in diamater, and is in close relation with the yolk gland on the side toward the genital pore and closer to the ventral surface than the yolk gland. The uterus develops immediately in front of and dorsal of the ovary and becomes a rounded simple sac-like organ. In front of the uterus and in immediate relation with it a para-uterine organ develops. The outer wall of the para-uterine organ is made up of fibers running in a circular direction. Its contents have in some cases a granular, in others a finely fibrous appearance. The uterus and para-uterine organ, before the eggs have left the uterus, together form an ovoid structure occupying most of the median field of the segment. In the specimens which I have examined, this structure is placed diagonally in the segment, the uterus posterior toward the side of the segment on which the genital pore is located, and the para-uterine organ toward the opposite anterior corner, except in contracted segments, in which the axis of uterus and para-uterine organ may be transverse.

The eggs are few in number and spindle shaped. The oncosphere measures from 20 to 25μ in diameter. It is surrounded by two membranes, an inner membrane prolonged at each pole into a long, slender process, with finely granular contents and an outer membrane 30 to 36μ in diameter, prolonged at each pole into a long pointed process, wihin which lies the prolongation of the inner membrane.

Genus HYMENOLEPIS Weinland, 1858.

(For generic diagnosis see p. 91.)

HYMENOLEPIS CANTANIANA (Polonio, 1860) Ransom, 1909.

Figs. 28, 29.

Taenia cantaniana Polonio, 1860b, pp. 21–22.
(?*Davainea*) *cantaniana* (Polonio) Blanchard, 1891, pp. 439–440.
Davainea oligophora Magalhães, 1898c, pp. 145–149, figs. 1–6.
Davainea cantaniana (Polonio) Railliet and Lucet, 1899a, p. 140.

This species, which occurs in turkeys, chickens, pheasants (*Phasianus colchicus*), and peafowls (a host hitherto unrecorded), is one concerning which there has been considerable discussion.

It was originally described by Polonio (1860b, pp. 21–22). His description translated reads as follows:

Taenia cantaniana Polonio.—Head globose [illegible] in the center [illegible] suckers placed at equal intervals about [illegible] of the head; neck absent [illegible] body increased in size posteriorly, with the first segments campaniform, following segments campaniform trapezoidal imbricate; genital pores marginal. Length, 13 mm.

Habitaculum: *Meleagris gallopavo*, intestine, October, Padua (Polonio).[a]

In a second paper Polonio (1860a, p. 221) gave a figure of the species.

Blanchard (1891t, pp. 439–440) looked upon this form as a possible member of the genus *Davainea*, and from Polonio's figure deduced the following characters:

Suckers large and round; the head seems to be surmounted by a very short rostellum, probably retractile. The neck is quite long, distinctly separated from the head. Segments number about 60. The genital pores are unilateral; cirrus pouch is visible in the twenty-sixth to the forty-fifth segment; the forty-sixth to sixtieth segments are filled with eggs, which, so far as may be judged from the figure, are scattered and isolated as in *Davainea proglottina*.

Stiles (1896f, p. 57) considers that Polonio's description and figure are insufficient to allow the recognition of the species, and would therefore ignore the species entirely.

In 1898 Magalhães (1898c, pp. 445–449, figs. 1–6) described as a new species *Davainea oligophora*, a tapeworm found in chickens in Brazil. His description may be summarized as follows:

Length, 1.73 to 3.2 mm.; width, 170 to 390μ. Head relatively large, 85 to 108μ long by 51 to 108μ wide, with a small rostellum armed at its base with a crown of numerous small hooks, which are very instable and usually absent. The form of these hooks is that of a hammer with recurved beak. The suckers are almost circular, slightly elliptical, measuring 61 to 72μ in longitudinal diameter by 43 to 54μ in transverse diameter. They are armed with three to four circular rows of little hooks, which are very instable. The neck is short, at times even lacking, and measures 16 to 18μ long by 51 to 90μ wide. The segments number from 45 to 75, much wider than long, with posterior borders somewhat longer than the anterior borders. The length of the segments gradually increases from 20μ in the first segments to 100μ in the final segments, and the width from 80 to 100μ in the first segments to 300 to 390μ in the final segments. The sexual pores are unilateral, located one in the anterior portion of each segment. The cirrus is very small, cylindrical, apparently provided with few small spines. A seminal vesicle [misinterpretation of the seminal receptacle] is very apparent in the posterior half

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[a] *T. cantaniana* Polonio. Caput globosum, centro umbonatum; acetabulis cruciatim oppositis ob majorem capitis circulum; collum nullum; corpus retrorsum dilatatum, articulis supremis campanæformibus, sequentibus campanæformibus imbricatis trapezoidalibus; aperturæ genitales marginales. Long. 0.013.

Habitaculum: *Meleagris gallopavo*, in intestina, Octobri, Patavi (Polonio).

of the strobila, especially in the last 15 to 25 segments. This organ, which is located in the region of the genital pore, is ampulliform, ellipsoidal, and filled with spermatozoa; from it may be traced the long sinuous vas deferens. The last three to eight segments contain fully developed eggs, which are few in number. They seem to be scattered in the parenchyma or contained in a cavity which has pushed aside the parenchyma, and they so fill the segment that no other structures are visible except the seminal vesicle [receptacle]. They are spherical, with three envelopes, and measure 45 to 50μ in diameter. The outer membrane is smooth and transparent; between it and a second membrane of double contour is a granular mass. The third membrane is that which immediately surrounds the oncosphere. The oncosphere measures 25 to 30μ in diameter; its hooks, 18μ in length; the diameter of the second membrane is 32μ.

Railliet and Lucet (1899a, pp. 144–146) have reported the discovery of tapeworms in turkeys which they consider identical with *Tænia cantaniana*. These worms present the following characters: Length, 1.9 to 3.2 mm.; maximum width, 200 to 320μ. Strobila consists of 50 to 88 segments. Eggs fully formed in the last 6 to 8 segments, also apparent in less fully developed condition in preceding segments, so that the last 15 to 18 segments may be looked upon as gravid. The eggs are spherical with three envelopes, the internal and external one the thicker. The external envelope has a diameter of 54 to 57μ, the middle 39 to 42μ; the internal one surrounding the oncosphere is 25 to 30μ in diameter. The hooks of the oncosphere are 12 to 13μ in length.

These authors are of the opinion that *Davainea oligophora* Magalhães is identical with *Tænia cantaniana* Polonio in view of the striking similarity of the figures of Polonio and Magalhães.

Magalhães (1899b, pp. 180–182) refused to accept the view of Railliet and Lucet on the ground that Polonio's description is too incomplete to give the species *Tænia cantaniana* any standing. Contrary to the opinions of Stiles and Magalhães, it seems to me that Railliet and Lucet are correct in considering *Tænia cantaniana* a recognizable species, and I believe that the forms which I have studied are sufficiently similar to Polonio's description and figure to justify their identification as *Tænia cantaniana*. They also agree so closely with Magalhães's description of *Davainea oligophora* that there is little doubt of their identity with that species.

The lack of hooks in all specimens which I have examined is one point of difference from *Davainea oligophora*, but as Magalhães found hooks in but few cases and states that they are very instable and usually absent, this difference is not very remarkable. In other respects the head is entirely like that of *Davainea oligophora*, though I have found it slightly larger than described by Magalhães. There is almost perfect correspondence in the characters of the strobila so far as may be determined from Magalhães's description. The structure which Magelhães interprets as a seminal vesicle corresponds to the seminal receptacle in my specimens. The eggs of the two forms agree in size, number, arrangement, and in all respects except the size of the hooks of the oncosphere, a difference which, on account of the small size of these structures and the consequent liability of error in measurement, can not be considered of great importance.

The species which I have identified as *Tænia cantaniana* has been found several times in this country in chickens and once in a peafowl. After brief study it became evident that it belonged in the genus *Hymenolepis* and not in *Davainea*, where it has been commonly placed. The following description is based on specimens in the collection of the Bureau of Animal Industry, Nos. 4109, 4198, 4569, 14554, and 14814 from chickens, Maryland and District of Columbia, No. 14423 from a peafowl, District of Columbia, and No. 2761, collected from a turkey in France by Railliet and determined by him as *Tænia cantaniana.*

External anatomy.

The specimens (fig. 28) which I have examined vary in length from 2 to 12 mm. The maximum breadth is about 0.4 mm. The head measures 120 to 160μ in width and thickness, by 100 to 120μ in length.

The rostellum is rudimentary, an elongated sac-like structure in the central axis of the head, 80μ long by 35μ in diameter, into the anterior end of which is a deep, narrow invagination with cuticular lining 30 to 40μ in depth by 4 to 6μ in diameter.

The suckers measure 60 to 70μ in diameter. In none of the specimens studied, including some which were very young and immature, was there any trace of hooks either upon the rostellum or suckers. The neck is 80 to 90μ wide by 100 to 130μ long.

The width of the strobila gradually increases from the neck toward the posterior end, near which it reaches the maximum.

The segments are considerably broader than long throughout the strobila, the posterior angles project but slightly, and there is no overlapping of the posterior border of one segment over the anterior portion of the next following segment. A strobila 6.5 mm. long consisted of about 100 segments, of which the posterior 13 contained fully developed eggs. In the widest portion of this strobila the segments measured 80μ in length by 250μ in width. A strobila 8 mm. in length consisted of about 215 segments, of which the posterior 16 contained fully developed eggs. In the widest portion of this strobila the segments were 60 to 70μ long and 300μ wide. Segments

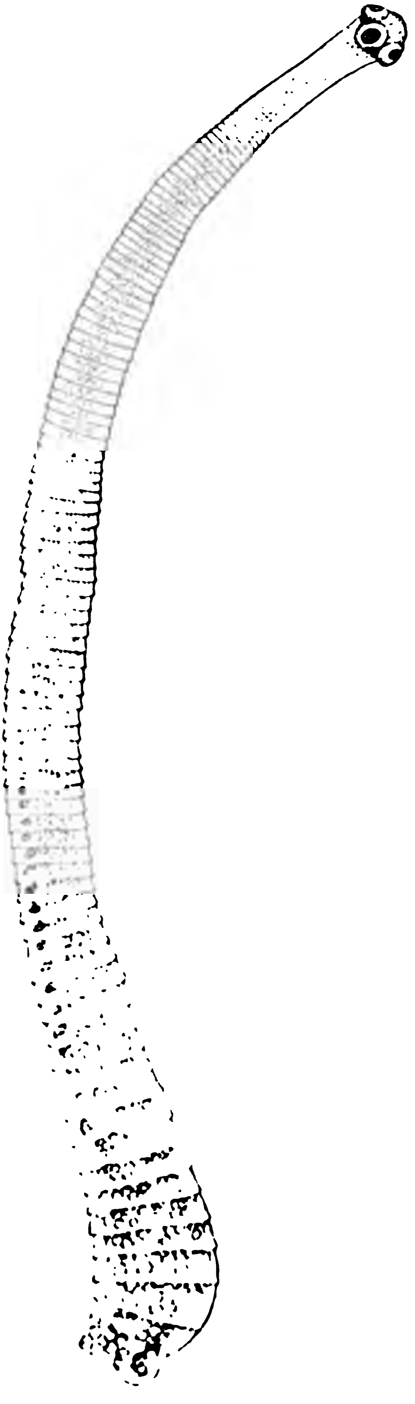

FIG. 28.—HYMENOLEPIS CANTANIANA: ENTIRE WORM. × 60.

2.5 mm. behind the head in which the male organs had just reached the functional stage measured 30μ in length by 120μ in width.

The genital pores are unilateral on the right-hand margin of the strobila, located slightly in front of the middle of each segment.

Internal anatomy.

The cirrus pouch and seminal vesicle are dorsal of the excretory vessels.

Male reproductive organs.—The testicles are three in number, dorsally located one on the right-hand side and two on the left-hand side of the segment. They reach a maximum size of 25μ in diameter. A seminal vesicle is present in the anterior portion of the segment near the median line; it attains a size of 25 to 45μ in diameter.

The cirrus pouch is elongated, tapering toward its outer end, and measures 75 to 95μ in length by 12 to 18μ in diameter. Its inner end is near the anterior border of the segment and extends beyond the median line in the younger segments. The outer wall of the pouch is thin without definite muscle elements. Within the pouch the vas deferens is enlarged to form a seminal reservoir, which occupies more or less of the cavity of the pouch.

Female reproductive organs.—In sexually mature segments the vagina is swollen to form a prominent seminal receptacle located near the right-hand border of the segment ventral of the cirrus pouch, oval in shape, and attaining a maximum of 30 to 35μ by 45 to 50μ in width and length.

The ovary when fully developed is transversely elongated, extending laterally as far as the excretory canals and measuring 135μ in its longest dimension. It extends forward to the anterior border of the segment, but does not reach the posterior border. In the median line behind the ovary is the small rounded yolk gland, which measures about 20μ in diameter.

The uterus develops as a simple sac on the ventral side of the ovary, and the latter rapidly degenerates after the appearance of the former. When fully developed the uterus occupies practically the entire segment, and as its wall becomes folded inward in various places its cavity is divided into a number of incompletely separated chambers. The number of eggs in the gravid segment is small, 18 to 20, but on account of the large size which they finally attain the cavity of the uterus is fully occupied.

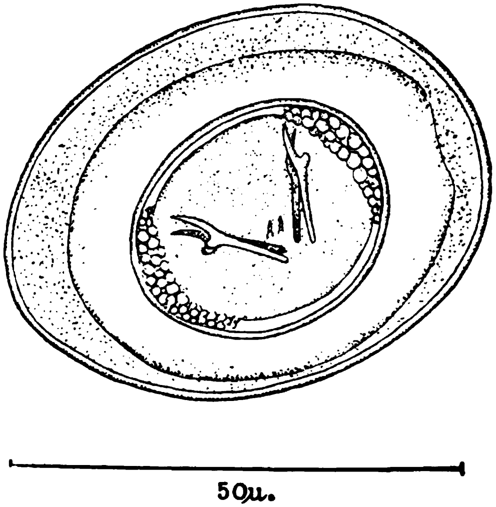

FIG. 29.—HYMENOLEPIS CANTANIANA: EGG.

When they first enter the uterus the eggs have but a single thin membrane and measure but 20μ in diameter. Later other membranes are developed, and the egg (fig. 29) in the final stage of development possesses two well-defined shells, an inner one 27 to 35μ in diameter and an outer one 45 to 60μ in diameter. Between the outer and inner shell is an intermediate finely granular layer limited by a very thin membrane internally and externally. The oncosphere measures 22 to 25μ in diameter with hooks 13 to 14μ in length.

Genus DIORCHIS Clerc, 1903.

(For generic diagnosis see p. 98.)

DIORCHIS ACUMINATA (Clerc, 1902) Clerc, 1903.

Figs. 30–36.

Drepanidotænia acuminata CLERC, 1902a, p. 659, figs. 3, 4.
Diorchis acuminata (CLERC, 1902) CLERC, 1903, pp. 248, 249, 255, 281–284; pl. 8, fig. 13; pl. 9, fig. 25; pl. 11, figs. 78, 79.
Diorchis accuminata CLERC, 1903, p. 249 (misprint for *D. acuminata*).
Tænia acuminata CLERC, 1903, p. 283

Specimens of a tapeworm (from the collection of H. B. Ward, deposited in the U. S. National Museum Helminthological Collection, No. 7237) collected in Nebraska from *Fulica americana* apparently belong to the species *Diorchis acuminata*.

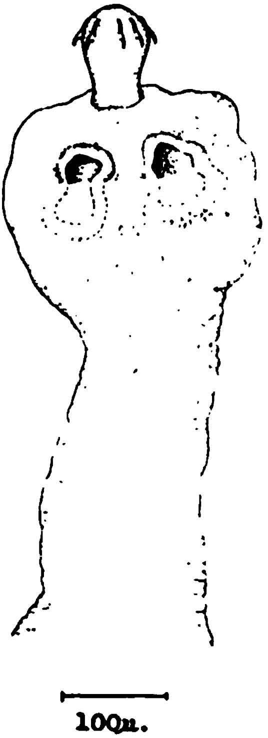

FIG. 30.—DIORCHIS ACUMINATA. HEAD AND ANTERIOR PORTION OF STROBILA.

External anatomy.

These specimens measure 35 mm. in length by 0.65 mm. in maximum breadth. The final segments were not yet gravid, and it is consequently evident that the full-grown worm may be considerably larger than indicated by the above figures.

The head (figs. 30, 31) measures 160μ in length by 225 to 235μ in width. The rostellum is cylindrical when protruded, slightly broader at the tip than at the base, measuring 100μ in length by 50μ in diameter at the base and 70μ in diameter at the tip. It is armed with 10 hooks (fig. 32), with long dorsal and short ventral root and measuring 38μ in length, the dorsal root being 25μ and the prong 13μ in length. The suckers are about 80μ in diameter and are armed with minute spines less than 5μ in length, set close together in diagonal rows covering the entire surface of the sucker.

Segmentation begins very close behind the head, and in this region the strobila is of about the same breadth as the head. The breadth then becomes reduced to about 150μ and afterwards gradually increases throughout the remainder of the strobila. The segments are broader than long, the largest measuring 80μ in length by 650μ in width.

The genital pores are unilateral. In each segment the pore is located near the middle of the right-hand margin.

Internal anatomy.

Nervous system.—The lateral longitudinal nerves (fig. 34, *l. n.*) are about midway between the lateral borders of the segment and the excretory vessels.

Musculature.—The longitudinal muscles are arranged in two layers. The outer layer (fig. 34, *ext. musc.*) is composed of numerous small bundles of fibers close to the surface of the segment. The inner layer (fig. 34, *int. musc.*) consists of eight bundles, as a rule somewhat larger than the outer bundles, and conspicuous only in young segments.

Transverse muscle fibers are well developed only at the junction of the segments. The dorso-ventral fibers are very weakly developed.

Excretory system.—The longitudinal excretory vessels (figs. 34, *v. ex.*, *d. ex.*; 35, *v. ex.*) in the older segments are located near the ventral surface on the right-hand (pore) side of the segment and near the dorsal surface on the left-hand side. The dorsal vessel is close to and dorsal of the ventral vessel. The ventral vessels are not connected by transverse vessels.

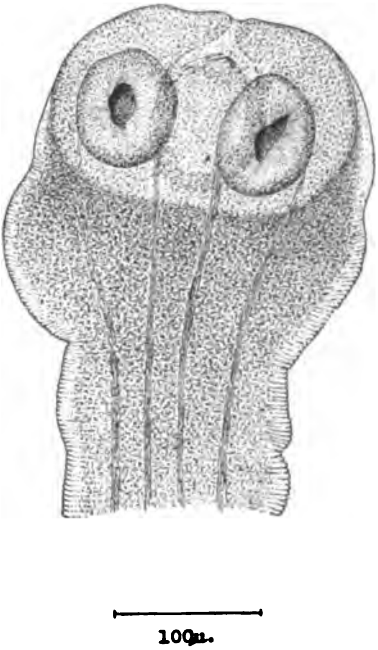

Fig. 31.—Diorchis acuminata: Head with retracted rostellum.

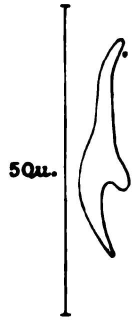

Fig. 32.—Diorchis acuminata: Hook from rostellum.

The cirrus pouch and vagina pass dorsal of the nerve and excretory vessels.

Male reproductive organs.—The testicles (fig. 33, *t.*) are two in number, located near the dorsal surface in the posterior portion of the segment, one on either side of the median line, and reach a maximum size of 100 to 130μ. A portion of the vas deferens is swollen to form a seminal vesicle (figs. 33, 34, *ves. sem.*), which attains a size of 80 to 130μ in diameter. This seminal vesicle is located in the median line close to the anterior border of the segment near the dorsal surface.

The cirrus pouch (figs. 33, 34, *c. p.*) is elongated, extending transversely across the segment. As a rule its inner end does not reach the median line. It measures 180 to 280μ in length, and 45 to 55μ in maximum thickness. It is covered with a layer of longitudinal muscles, thickest near the middle and diminishing in thickness toward each end of the pouch. Within the cirrus pouch the vas deferens is swollen to form a seminal reservoir occupying more or less of the cavity of the pouch, according to the quantity of spermatozoa contained. The cirrus (figs. 33, 35, *cir.*) is unarmed; when extruded it measures 6 to 8μ in diameter, with a globular swelling at its base 14 to 16μ in diameter. When fully extruded it measures over 150μ in length.

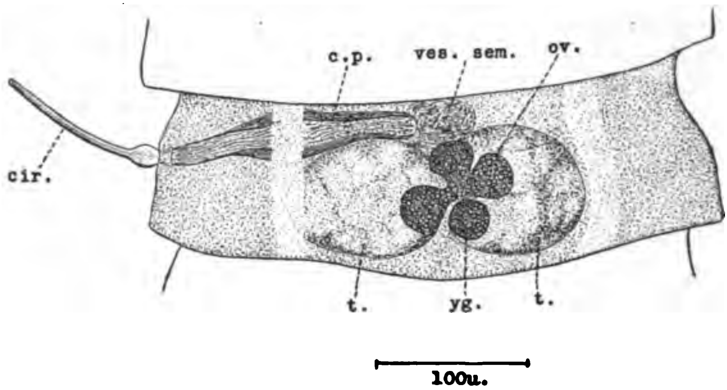

Fig. 33.—Diorchis acuminata: Sexually mature segment. *cir.*, Cirrus. *c. p.*, Cirrus pouch. *ov.*, Ovary. *t.*, Testicles. *ves. sem.*, Seminal vesicle. *yg.*, Yolk gland.

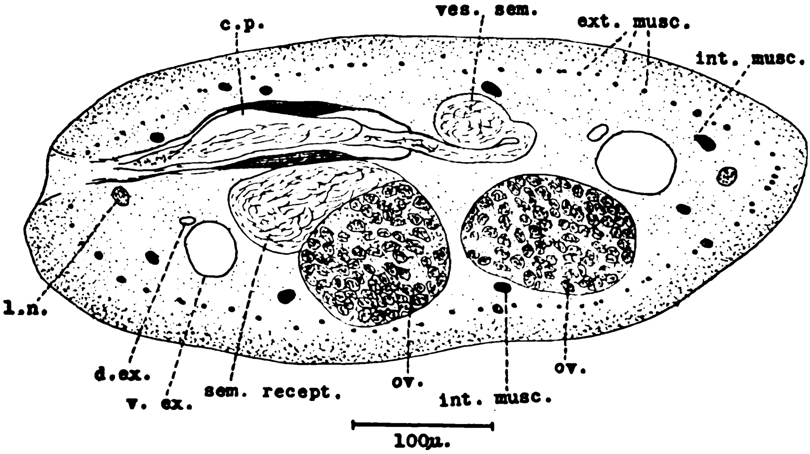

Fig. 34.—Diorchis acuminata: Sexually mature segment, transverse section. *c. p.*, Cirrus pouch. *d. ex.*, Dorsal excretory vessel. *ext. musc.*, Outer longitudinal muscles. *int. musc.*, Inner longitudinal muscles. *l. n.*, Nerve cord. *ov.*, Ovary. *sem. recept.*, Seminal receptacle. *v. ex.*, Ventral excretory vessel. *ves. sem.*, Seminal vesicle.

Female reproductive organs.—The vagina, after crossing the excretory canals, is enlarged to form a seminal receptacle (figs. 34, 36, *sem. recept.*), which extends inward as far as the inner end of the cirrus pouch.

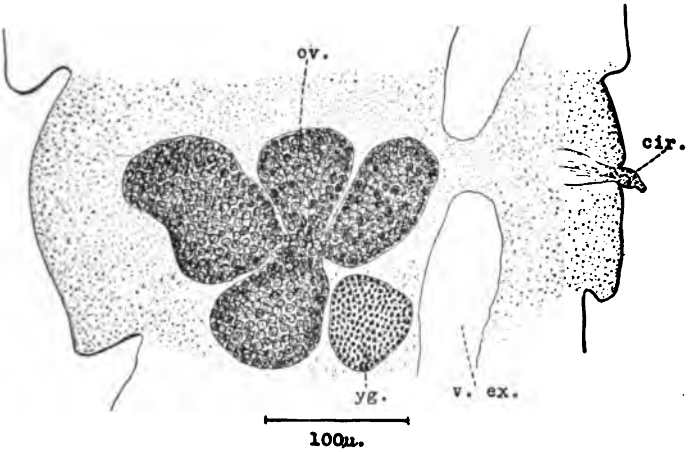

FIG. 35.—DIORCHIS ACUMINATA: SEXUALLY MATURE SEGMENT, HORIZONTAL SECTION. *cir.*, CIRRUS. *ov.*, OVARY. *v. ex.*, VENTRAL EXCRETORY VESSEL. *yg.*, YOLK GLAND.

The ovary (figs. 33–36, *ov.*) is trilobed, one lobe being anterior and median, the other two lateral; often by a division of the left lateral lobe it becomes four-lobed. When fully developed the ovary extends laterally as far as the excretory canals, and the median lobe extends forward to the anterior border of the segment. It is ventral with respect to the testicles.

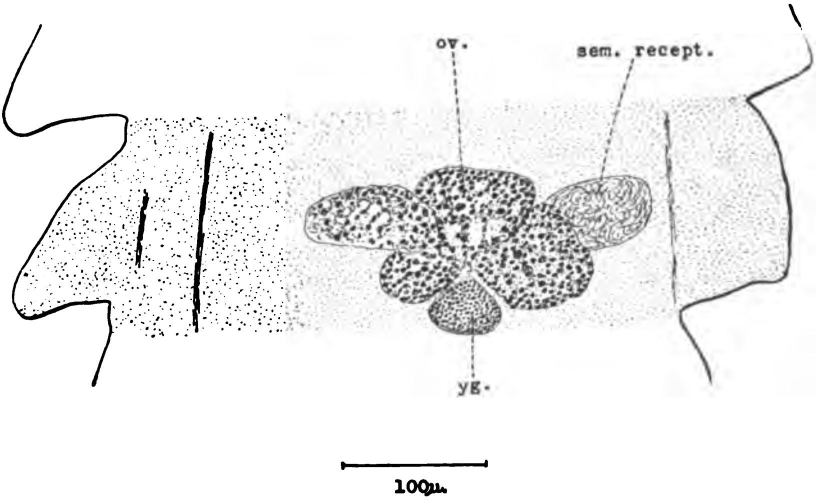

FIG. 36.—DIORCHIS ACUMINATA: SEXUALLY MATURE SEGMENT, HORIZONTAL SECTION. *ov.*, OVARY. *sem. recept.*, SEMINAL RECEPTACLE. *yg.*, YOLK GLAND.

The yolk gland (figs. 33, 35, 36, *yg.*) is spherical, 45 to 60μ in diameter, located in the median line near the ventral surface of the segment, behind the middle of the ovary, in the niche between the right and left lateral lobes.

The uterus was not yet developed in the specimens studied.

Remarks.

In certain respects the tapeworm described above is strikingly similar to a form from *Fulica atra* described by Jacobi (1898c, pp. 95–104, pl. 6, figs. 1–16) as *Tænia inflata* Rudolphi.

The chief characters of this form, summarized from Jacobi's description, are as follows:

Length 80 to 100 mm., width 2 to 3 mm. Head with a prominent rostellum [similar in shape to that of *Diorchis acuminata*], armed with a crown of 10 hooks, 23μ long [similar in form to those of *Diorchis acuminata*]. Segments broader than long throughout the strobila. Genital pores unilateral. Longitudinal muscles arranged in two layers of bundles, an outer layer of numerous small bundles close to the surface of the body, and an inner layer of 8 larger bundles [as in *Diorchis acuminata*]. The cirrus pouch and vagina pass on the dorsal side of the longitudinal nerve and excretory vessels. Testicles two. Seminal vesicle absent; vas deferens enlarged within the cirrus pouch to form a seminal reservoir. Cirrus pouch with an outer layer of longitudinal muscles [as in *Diorchis acuminata*]. Size of cirrus pouch[a] not exactly stated, but it does not extend as far as the median line. Cirrus unarmed; when extruded has a bulbous enlargement at the base [as in *Diorchis acuminata*], and, to judge from the scale of magnification to which Jacobi's figures are drawn, measures from 6 to 8μ in diameter, the bulbous enlargement being 12 to 14μ in diameter. Vagina enlarged to form a seminal receptacle. Ovary trilobed; shell gland spherical, ventral of and posterior of the ovary. The ovary, when fully mature, is about one-fourth as wide as the segment. The uterus is a simple sac, which develops on the dorsal side of the ovary and ventral of the testicles. Eggs with two thin shells in addition to a membrane, which closely invests the oncosphere. The shells are drawn out into pointed processes at the poles. Oncosphere 17μ in maximum diameter, outer shell 37 to 41μ in length, hooks of oncosphere 9.2μ long.

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[a] Clerc (1903) describes and figures the cirrus pouch in a form from *Fulica atra* which he has identified with Jacobi's species, as very long and extending far beyond the median line. Jacobi, although remarking that the cirrus pouch is very long, distinctly states that it extends *almost* to the median line, and it is thus shown in his figures. Whether such a wide variation in the size of cirrus pouch may occur, or whether Clerc had before him some other species, are questions which can not be definitely determined until further evidence is available.

In general structure the form from *Fulica americana* and Jacobi's species are alike, and the cirrus pouch and cirrus in size and shape are practically the same in both. Comparing, however, the length of the hooks of Jacobi's species, 23μ, with that of the hooks of the form which I have described, 38μ, and taking into consideration the lack of a seminal vesicle in the former, its presence in the latter, the small size of the fully developed ovary in the former, and the very large size of the ovary in the latter, it seems necessary to look upon these forms as two different species.

Diorchis acuminata, collected from *Anas crecca*, *A. strepera*, and *Fulica atra*, as described by Clerc (1903, pp. 281–284, pl. 8, fig. 13; pl. 9, fig. 25; pl. 11, figs. 78, 88), measures about 80 mm. in length and 1.2 mm. in maximum breadth. The width of the head varies from 230 to 320μ. The rostellum is armed with 10 hooks 27 to 39μ in length. The segments are broader than long throughout the strobila, the usual ratio being 14 to 1. Fully developed eggs are present in segments 50 to 60 mm. from the scolex, and the female genital glands are well developed in segments 25 mm. from the scolex. The genital pores are unilateral. The excretory vessels are without commissures in the posterior part of the segment. The longitudinal muscles are arranged in two layers, numerous small bundles in the outer layer, and 8 larger bundles in the inner layer. The vagina and cirrus pouch pass dorsal of the excretory vessels and nerve. There are two testicles present in each segment, reaching their maximum development in segments 15 to 17 mm. from the head. The cirrus pouch measures at its maximum of development 150 to 160μ in length, is straight or slightly curved, shaped like a thick spindle, and does not reach the median line of the segment. Its musculature consists especially of longitudinal fibers. The female glands occupy very little space, never exceeding in size one-third of the width of the segment. They are located exactly in the middle of the segment beneath the testicles. The ovary is "double, non lobé, en forme d'haltère recourbé dont les extrémités épaissies sont tournées vers la face dorsale." The yolk gland is globular, small, and located between the two wings of the ovary. The vagina is ventral of the cirrus pouch. Its initial portion is muscular, the remainder is swollen, possesses thin walls and acts as a seminal receptacle. The uterus is sac-like. At the beginning of its development it is like a narrow transverse canal. It develops large lobes which penetrate between the longitudinal muscles and beyond the excretory vessels. The eggs are elongated in form.

The only differences between the form from *Fulica americana* and Clerc's species, so far as may be determined from Clerc's description, are in the length of the cirrus pouch (which is slightly greater in the specimens from *Fulica americana*) and in the shape and size of the ovary. Although Clerc makes no reference to the presence of spines on the suckers, this is a feature which is very inconspicuous and may have been overlooked by that author.[a]

The differences mentioned seem to be insufficient to warrant a separation of the two forms, and the identification of the tapeworms from *Fulica americana* as *Diorchis acuminata*, accordingly, seems fully justifiable. Fuhrmann (1908a, pp. 7, 81), however considers it improbable that the same species should occur in birds so different as Anserines and Ralliforms, and explains Clerc's record of *Diorchis acuminata* in *Fulica* as due to some error, possibly a mistake in labeling. A comparison of specimens is needed to settle the question whether the forms from ducks and *Fulica* are of the same or different species.

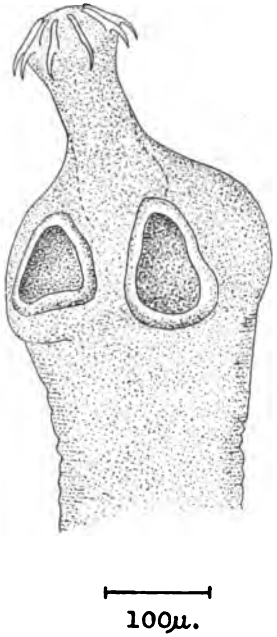

FIG. 37.—DIORCHIS AMERICANA: HEAD.

DIORCHIS AMERICANA, new species.

Figs. 37–42.

This species, which seems heretofore to have been undescribed, was found in company with *Diorchis acuminata* in *Fulica americana*, and is based on specimens (from the collection of H. B. Ward, deposited in the U. S. National Museum Helminthological Collection, No. 7238), collected in Nebraska.

External anatomy.

The length of specimens whose posterior segments were gravid, but in which the eggs had evidently not yet reached their full development, was from 20 to 25 mm. and the maximum width 0.6 mm. The head (fig. 37) measures 160μ in length by 250μ in width. The rostellum is similar in shape to that of *Diorchis acuminata* but larger, measuring when fully extended 135μ in length, by 50μ in diameter at the base and 80μ in diameter at the tip, armed with a crown of 10 hooks (fig. 38) 65μ long, similar in form to those of *Diorchis acuminata.*

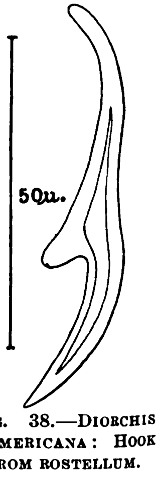

FIG. 38.—DIORCHIS AMERICANA: HOOK FROM ROSTELLUM.

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[a] Since publishing his description of *Diorchis acuminata* Clerc has informed Fuhrmann (1906b, p. 620) that he has observed that the suckers may be armed.

The dorsal root measures about 40μ and the prong of the hook about 25μ in length. The suckers are 100 to 120μ in diameter, covered over the entire surface as in *D. acuminata* with regularly arranged minute spines less than 5μ in length.

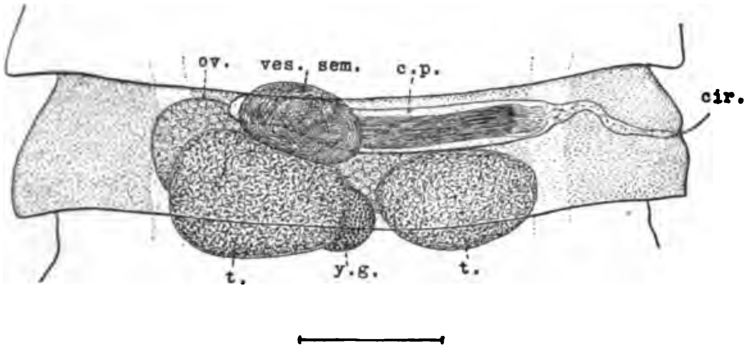

Fig. 39.—Diorchis americana: Sexually mature segment, at high focus to show male organs, dorsal view. *cir.*, Cirrus. *c. p.*, Cirrus pouch. *ov.*, Ovary. *t.*, Testicles. *ves. sem.*, Seminal vesicle. *y. g.*, Yolk gland.

As in *D. acuminata*, segmentation begins close behind the head, the width of the strobila at its beginning being about 160μ. The segments are broader than long throughout the strobila, and near the posterior end measure 110 to 115μ in length by 500 to 600μ in width.

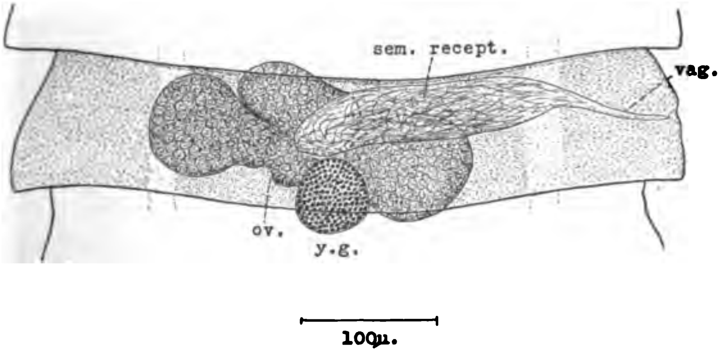

Fig. 40.—Diorchis americana: Sexually mature segment, at deep focus to show female organs, dorsal view. *ov.*, Ovary. *sem. recept.*, Seminal vesicle. *vag.*, Vagina. *y. g.*, Yolk gland.

The genital pores are unilateral on the right-hand margin of the strobila at about the middle of the segment.

Internal anatomy.

The nervous system, musculature, and excretory system are as described above for *Diorchis acuminata*, and as in the latter the vagina and cirrus pouch pass on the dorsal side of the nerve and excretory vessels.

In this species the segments become gravid much earlier than in the other, as the posterior segments of a strobila 20 mm. long contained a well-developed uterus, whereas in *Diorchis acuminata* the uterus had not yet appeared in the posterior segments of a strobila 35 mm. long.

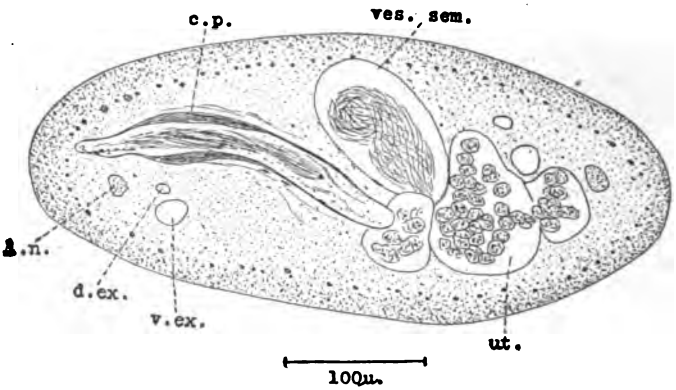

FIG. 41.—DIORCHIS AMERICANA: GRAVID SEGMENT, TRANSVERSE SECTION. *c. p.*, CIRRUS OUCH. *d. ex.*, DORAL EXCRETORY VESSEL. *l. n.*, NERVE CORD. *ut.*, UTERUS. *ves. sem.*, SEMINAL VESICLE. *v. ex.*, VENTRAL EXCRETORY VESSEL.

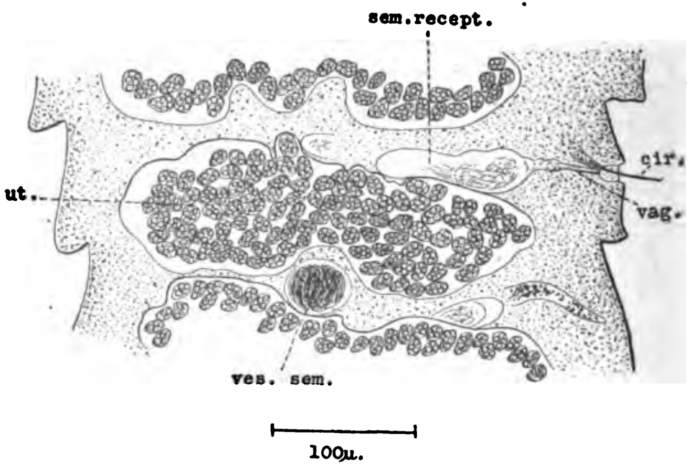

FIG. 42.—DIORCHIS AMERICANA: GRAVID SEGMENTS, HORIZONTAL SECTION. *cir.*, CIRRUS. *sem. recept.*, SEMINAL RECEPTACLE. *ut.*, UTERUS. *vag.*, VAGINA. *ves. sem.*, SEMINAL VESICLE.

Male reproductive organs.—The testicles (fig. 39, *t.*), two in number, attaining a maximum size of 100 to 130µ, are located, as in *D. acuminata*, in the posterior portion of the segment near the dorsal surface, one on either side of the median line.

In the anterior half of the segment in the median line the vas deferens is swollen to form a prominent seminal vesicle (figs. 39, 41, *ves. sem.*), 150μ or more in diameter. Usually the seminal vesicle is dorsal of, occasionally ventral of, the proximal end of the cirrus pouch. The cirrus pouch (figs. 39, 41, *c. p.*), usually somewhat curved, extends transversely across the anterior portion of the segment, measuring 250 to 300μ in length by 30 to 40μ in thickness. It is somewhat longer than the cirrus pouch of *D. acuminata* and usually extends beyond the median line of the segment. As in the latter species, the pouch is covered with a prominent layer of longitudinal muscles, thickest near the middle of the pouch. The vas deferens is enlarged to form a seminal reservoir within the cirrus pouch. In sharp contrast to *D. acuminata*, the cirrus (fig. 39, *cir.*) is very slender without bulbous enlargement at the base, measuring but 1.5 to 2μ in diameter when extruded, whereas in the other species it is from 6 to 8μ in diameter, and has a bulbous enlargement at the base 14 to 16μ in diameter. As in the latter species, it is unarmed. Its length when fully extruded is at least 100μ.

Female reproductive organs.—The vagina (figs. 40, 42, *vag.*), at first very narrow, becomes swollen beyond the excretory canals to form an elongated seminal receptacle (figs. 40, 42, *sem. recept.*), which lies against the ventral side of the cirrus pouch and extends as far as the inner end of the latter.

The ovary (figs. 39, 40, *ov.*), as in *D. acuminata*, is trilobed with occasionally a fourth lobe on the left-hand side, and when fully developed it extends laterally as far as the excretory canals, and its median lobe reaches the anterior border of the segment. It is located on the ventral side of the cirrus pouch, seminal vesicle, and seminal receptacle. The yolk gland (figs. 39, 40, *y. g.*) is similar in shape and size to that of *D. acuminata* and is similarly located.

The uterus (figs. 41, 42, *ut.*) is a simple sac, without partitions, and develops behind and dorsal of the ovary and ventral of the testicles. As the uterus increases in size and becomes filled with eggs the ovary degenerates and disappears. When fully developed the uterus extends from the posterior to the anterior border of the segment, and laterally beyond the excretory canals on each side, dorsal of the canals on the right side and ventral of the canals on the left side.

The eggs when they first enter the uterus measure 12 to 15μ in diameter and are closely surrounded by a very thin membrane. Eggs containing fully formed oncospheres were not present in the specimens studied.

SYNOPSIS OF THE SUPERFAMILY TÆNIOIDEA.

In the following synopsis I have adopted with a few modifications the arrangement into families recently proposed by Fuhrmann (1907a, 1908a), but instead of giving the group the rank of an order, Cyclophyllidea, I have followed Stiles (1906a) in classing it as a superfamily, Tænioidea. This change from order to superfamily is simply a change in name and rank and in itself does not necessitate any changes within the group. The subordinate groups of the order Cyclophyllidea as arranged by Fuhrmann can be arranged in a similar way in the superfamily Tænioidea, and this is what has been done in the present article, with, however, a number of modifications, the most important of which are as follows:

In his family "Dilepinidæ" Fuhrmann has recognized three subfamilies, "Dilepininæ," Dipylidiinæ, and "Paruterinæ," and has placed in a separate family, "Hymenolepidæ," the genera *Hymenolepis*, *Oligorchis*, *Diorchis*, and *Aploparaksis*. I have, however, preferred to unite "Hymenolepidæ" with "Dilepinidæ" and "Dilepininæ" with Dipylidiinæ, and accordingly recognize, instead of the two families, one family Hymenolepididæ, with Dipylidiinæ, Hymenolepidinæ, and Paruterininæ (= Paruterinæ Fuhrmann) as subfamilies.

The genus *Stilesia* appears to me much more closely related to the Paruterininæ than to the Anoplocephalidæ, and I have accordingly placed it in the former group.

A number of minor changes, such as changes in names, are noted in their appropriate places. Changes in names have been made in accordance with the International Code of Zoological Nomenclature.

Superfamily TÆNIOIDEA.

Superfamily diagnosis.—Cestoda: Scolex with four cup-shaped suckers which may exceptionally (Tetrabothriidæ) bear auricular appendages. Apical rostellum present or lacking. Suckers and rostellum may be armed with hooks or unarmed. Neck present or absent. Strobila with well-developed segmentation, or, exceptionally (Fimbriariidæ) without division into segments. A single series or complete or incomplete double series of reproductive organs. Genital pores usually present and marginal, or exceptionally on ventral surface. Testicles usually numerous, in medullary portion of segment. Ovary more or less bilobed. Yolk gland compact, and posterior, dorsal, ventral, or laterad of ovary, rarely (family Tetrabothriidæ) anterior of ovary. Shell gland between ovary and yolk gland. Uterus without special opening to the exterior, except that rarely a secondarily formed opening may be present. Egg (i. e., fertilized egg=

embryo, oncosphere) with one or several membranes; without operculum. Larval stage in vertebrates or invertebrates. Adults in alimentary canal of vertebrates.

Type-family.—Tæniidæ Ludwig, 1886.

KEY TO GENERA.[a]

1. Genital pores marginal or (?) absent .... 2.
Genital pores ventral, in or near median line; scolex unarmed, without rostellum; a single egg capsule in the gravid segment. Mesocestoididæ, *Mesocestoides*, p. 61.
2. One cirrus pouch in each segment, or two in each segment, one on either side .... 3.
Several cirrus pouches in each lateral half of each segment; segmentation not apparent externally; one testicle, ovary, yolk gland, and uterus in each lateral half of the segment; egg with well-developed pyriform apparatus; head unarmed, without rostellum; adults in marsupials. *Triplotænia*, p. 62.
3. Vaginal pore anterior of male opening .... *Tetracisdicotyla*, p. 106.
Vaginal pore posterior, dorsal, or ventral of male opening, or absent .... 4.
4. Anterior portion of strobila enlarged and modified to form a large pseudo scolex; strobila grooved transversely, but without proglottids. Fimbriariidæ, *Fimbriaria*, p. 105.
Strobila without pseudo scolex; with more or less definite proglottids, or segments .... 5.
5. Yolk gland in front of ovary; suckers with auricular appendages on anterior border .... Tetrabothriidæ, *Tetrabothrius*, p. 59.
Yolk gland posterior, dorsal, ventral, or lateral of ovary; suckers without auricular appendages .... 6.
6. Vaginal pore lacking .... 7.
Vaginal pore present .... 15.
7. Male and female genital openings both (?) lacking; scolex without rostellum; suckers unarmed; a single set of reproductive organs in each segment; female glands near one side of the segment; cirrus pouch rudimentary, unites with distal end of vagina in lateral field of segment .... *Aporina*, p. 64.
Male genital opening present .... 8.
8. Scolex with armed rostellum; segments with lateral appendages; accessory female genital canal present, functioning as vagina, with dorsal, ventral, or marginal opening .... 9 (Amabiliidæ).
Scolex with or without rostellum; segments without lateral appendages; vagina, without external opening, functions as seminal receptacle. 11 (Acoleidæ).
9. A double set of male reproductive organs and a single set of female organs in each segment; two male genital pores in each segment, one on each side; opening of accessory vagina ventral .... *Amabilia*, p. 103.
A single set of reproductive organs in each segment; male genital pores regularly or irregularly alternate .... 10.
10. Suckers and posterior portion of head covered with minute spines; segments of strobila not numerous; testicles few; vagina of each segment turns backward into and communicates with the seminal vesicle of the next

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[a] The genus *Copesoma* (p. 106) is not included in this key.

following segment; an accessory vagina in the opposite side of the segment from the cirrus pouch, sometimes with marginal opening-----*Tatria*, p. 104.

Rostellum very large; suckers and posterior portion of head without spiny armature; testicles numerous, extend across entire width of segment; vagina absent; accessory vagina dorso-ventral, with median opening on dorsal and ventral surfaces of segment-----*Schistotænia*, p. 104

11. Diœcius, entire strobila male or female; male with a double set, female with a single set of reproductive organs in each segment-----*Dioicocestus*, p. 103.

Monœcius----- 12.

12. A single set of reproductive organs in each segment----- 13.

A double set of male reproductive organs and a single set of female reproductive organs in each segment, with two vaginæ functioning as large seminal receptacles-----*Diplophallus*, p. 102.

13. Scolex with armed rostellum----- 14.

Scolex without rostellum, but with apical papilla; cirrus conical in shape, armed with large hooks-----*Shipleya*, p. 103.

14. Rostellum armed with a single crown of hooks arranged in a zigzag row having right angles; testicles few; seminal receptacle very small; uterus with dorsal and ventral openings-----*Gyrocœlia*, p. 102.

Testicles numerous; seminal receptacle very large; uterus without opening to the exterior-----*Acoleus*, p. 102.

15. Scolex with rostellum armed with a double row (rarely a single or triple row) of very numerous (and generally very small) hammer-shaped hooks, i. e., with long ventral root, very short dorsal root, and short blade; suckers usually armed ----- 16 (Davaineidæ).

Scolex with rostellum armed with hooks not hammer shaped, without rostellum, or with rudimentary unarmed rostellum; suckers usually armed- 21.

16. Rostellum broader than rest of scolex; suckers armed only near anterior border; a single set of reproductive organs in each segment; uterus saclike, persistent-----*Ophryocotyle*, p. 67.

Rostellum not broader than rest of scolex; suckers armed with several rings of hooklets around the periphery or unarmed; a single or double set of reproductive organs in each segment; uterus not persistent, replaced by egg capsules, with or without the formation of para-uterine organs----- 17.

17. Uterus breaks down into numerous egg capsules, each containing one or more eggs; para-uterine organs not present----- 18.

A para-uterine organ present, into which the eggs pass, and which transforms into an egg capsule----- 20.

18. A single set of reproductive organs in each segment----- 19.

A double set of reproductive organs in each segment; eggs become inclosed singly in egg capsules-----*Cotugnia*, p. 69

19. Rostellum armed with a double or single row of hooks; dorsal excretory vessels present; genital pores unilateral or irregularly alternate; egg capsules contain one or several eggs-----*Davainea*, p. 67.

Rostellum armed with three rows of hooks; dorsal excretory vessels absent; genital pores unilateral; female glands on pore side of median line, near the ventral excretory vessel; eggs become inclosed singly in egg capsules-----*Porogynia*, p. 69.

20. Eggs pass directly from uterus into a para-uterine organ, which transforms into an egg capsule-----*Idiogenes*, p. 70.

Eggs become inclosed in numerous egg capsules following the disappearance of the uterus, and finally are pressed into a large anteriorly located para-uterine organ which transforms into an egg capsule-*Chapmania*, p. 70.

21. Scolex without rostellum, or with rudimentary unarmed rostellum------ 49.
Scolex with armed rostellum-- 22.

22. Rostellum armed with a double crown of large hooks; genital pores irregularly alternate; uterus with median stem and lateral branches; egg with thin outer membrane and thick, brown, radially striated inner shell. *Tænia*, p. 100.
Egg with thin transparent shells------------------------------------ 23.

23. Para-uterine organ present; rostellum armed with a double crown of hooks-- 24.
Para-uterine organ absent--- 26.

24. Uterus single-- 25.
Uterus more or less completely divided into two spherical sacs; hooks of rostellum triangular-----------------------------------*Biuterina*, p. 88.

25. Uterus much broader than long; para-uterine organ a transversely elongated parenchymatous mass in front of uterus; on pore side of segment the large usually ventral longitudinal excretory vessel is dorsal in position, and the narrow usually dorsal vessel ventral, the position being normal on other side---*Culcitella*, p. 86.
Uterus slightly broader than long, crescentic, in front of ovary, or straight. near posterior border of segment; para-uterine organ elongated anteroposteriorly in front of uterus; position of excretory vessels normal on both sides of segment-----------------------------*Paruterina*, p. 85

26. Rostellum armed with a single or double row of hooks; suckers armed or unarmed --- 27.
Rostellum armed with several rings of rose-thorn hooklets; a double set of reproductive organs in each segment; two genital pores in each segment, one on each side; uterus reticular, later breaking up into egg capsules. *Dipylidium*, p. 84.

27. A single set of reproductive organs in each segment------------------ 28.
A double set of male reproductive organs and a single set of female organs with two vaginæ in each segment; two genital pores in each segment, one on each side; uterus sac-like, persistent--------------*Diploposthe*, p. 101.

28. Uterus persistent-- 29.
Uterus breaks down into egg capsules, each containing one or several eggs; rostellum armed with a double or single crown of hooks; genital pores irregularly alternate, rarely unilateral; testicles numerous, behind the female glands or also laterally on both sides of the latter. *Monopylidium*, p. 76.

29. Hooks of rostellum arranged in a circular crown---------------------- 30.
Hooks of rostellum arranged in a zigzag crown; genital canals pass dorsal of excretory vessels; uterus very irregularly lobulated---*Angularia*, p. 83.

30. Crown of hooks single-- 31.
Crown of hooks double--- 41.

31. Genital pores unilateral-- 32.
Genital pores alternate--- 34.

32. Genital pores subdorsal; testicles few, but more than 4 in each segment; eggs few-------------------------------------*Trichocephaloides*, p. 73.
Genital pores strictly marginal; testicles numerous or few; eggs numerous, or. rarely, few--- 33.

33. Base of cirrus provided with one or two pairs of powerful spines lying in special pockets; genital canals pass between longitudinal excretory vessels---------------------------------------*Gryporhynchus*, p. 83.

Base of cirrus not provided with spines in special pockets; genital canals pass dorsal of excretory vessels .... 36.

34. Segments numerous, rarely less than 30; neck present; genital pores irregularly alternate near anterior border of segment; testicles numerous, posterior of female glands or also laterally on both sides of the latter; uterus a simple sac, or incompletely divided into numerous small communicating compartments .... *Choanotænia*, p. 74

Segments less than 30 in number; neck absent; genital pores regularly alternate .... 35.

35. Testicles in posterior portion of segment; cirrus pouch short. *Amœbotænia*, p. 80.

Testicles lateral in position toward the pore side of the segment; cirrus pouch very long .... *Leptotænia*, p. 81.

36. Testicles, 12 or more in each segment .... *Lateriporus*, p. 73.

Testicles, 1 to 4 in each segment .... 37 (Hymenolepidinæ).

37. Testicles, 4 in each segment .... *Oligorchis*, p. 89.

Testicles, 1 to 3 in each segment .... 38.

38. Testicles, 3 in each segment .... 39 (*Hymenolepis*).

Testicles, 1 or 2 in each segment .... 40.

39. Entire surface of suckers armed with minute spines, or (generally) unarmed; sacculus accessorius usually absent .... *Hymenolepis* s. str., p. 90.

Suckers armed on borders and in the middle with small hooklets; sacculus accessorius always present .... *Echinocotyle*, p. 98.

40. Testicles, 2 in each segment; entire surface of suckers armed with minute spines, or unarmed; rostellar hooks with long dorsal and short ventral roots (or exceptionally with very short dorsal root, and with ventral root nearly as long as the blade) .... *Diorchis*, p. 98.

One testicle in each segment; suckers (?) unarmed; rostellar hooks with ventral root as long or nearly as long as the blade; strobila small and slender .... *Aploparaksis*, p. 99.

41. Genital pores unilateral .... 42.

Genital pores alternate .... 45.

42. Root of cirrus with one or two pairs of powerful spines lying in special pockets; testicles few; genital canals pass between the longitudinal excretory vessels .... *Gryporhynchus*, p. 83.

Spiniferous sacs at base of cirrus lacking .... 43.

43. No testicles in front of female glands, but usually very numerous behind and at the sides; rostellar hooks with long dorsal and short ventral roots; genital canals pass dorsal of excretory vessels and nerve .... *Dilepis*, p. 71.

Testicles entirely surrounding the female glands, or limited to the region in front of the female glands .... 44.

44. Testicles very numerous, entirely surrounding the female glands; cirrus pouch communicating with the genital cloaca by a narrow canal opening upon a large papilla; rostellar hooks with a very large dorsal root and small hook portion .... *Cyclorchida*, p. 82.

Testicles limited to the region in front of female glands .... *Proorchida*, p. 82.

45. Testicles scattered throughout entire dorsal portion of medullary parenchyma; ovary and yolk gland surrounded by a ring-like uterus with secondary branches; genital canals pass between excretory vessels; longitudinal musculature in three layers .... *Cyclustera*, p. 81.

Testicles, in lateral or posterior portions of segment only .... 46.

46. Testicles in lateral portions of segment only .... 47.

Testicles in posterior portion of segment only .... 48.

47. Division of strobila into segments well marked; female glands toward pore side of segment; genital canals pass between the excretory vessels and ventral of the nerve; genital pores irregularly alternate. *Laterotænia*, p. 82.

Strobila small, division into segments not well marked; scolex large with small rostellum; reproductive glands very small; ovary and yolk gland toward pore side of segment; genital pores irregularly alternate. *Parvirostrum*, p. 81.

48. Genital canals pass between the longitudinal excretory vessels and dorsal of the nerve; genital pores irregularly alternate; strobila usually with numerous segments; uterus sac-like ---- *Anomotænia*, p. 77.

Genital canals pass dorsal of the longitudinal vessels and nerve; strobila with few segments (less than 30); genital pores regularly alternate; uterus much lobulated; outer shell of egg with tubular prolongation at each pole terminating in a globular expansion ---- *Liga*, p. 80.

49. A single genital pore in each segment ---- 50.

Two genital pores in each segment, one on each side ---- 67.

50. Para-uterine organs absent ---- 51.

Para-uterine organs present ---- 62.

51. Uterus persistent ---- 52.

Uterus not persistent, breaks down into numerous egg capsules, each containing one or more eggs ---- 60.

52. Three testicles in each segment; rostellum present but rudimentary and unarmed ---- *Hymenolepis* s. str., p. 90.

Testicles more than three in each segment ---- 53.

53. Uterus with median stem and lateral branches; rostellum rudimentary and unarmed, or lacking ---- 54.

Uterus sac-like or reticular, without median stem; rostellum lacking ---- 55.

54. Female glands in posterior median portion of segment; testicles scattered throughout the medullary parenchyma except the posterior median portion; egg with a thin outer membrane, and thick brown radially striated inner shell; rostellum present but unarmed and rudimentary ---- *Tænia*, p. 100.

Female glands in anterior portion of segment; testicles in posterior portion; egg with thin transparent shells; rostellum absent ---- *Catenotænia*, p. 84.

55. A distinct pedunculated prostatic gland near ventral excretory vessel on pore side of median line; egg with pyriform apparatus, the horns of which are rather short; adults in mammals ---- *Andrya*, p. 63.

Pedunculated prostatic gland absent ---- 56.

56. Eggs with pyriform apparatus ---- 57.

Eggs without pyriform apparatus ---- 59.

57. Uterus a transversely elongated sac with outpocketings anteriorly and posteriorly ---- 58.

Extreme lateral portions of uterus sac-like, remainder a complicated system of irregular lacunæ; testicles near the posterior border of segment extending from the excretory vessels of one side to those of the other; adults in mammals ---- *Schizotænia*, p. 64.

58. Testicles in anterior portion of segment extending entirely across the median field as far as the excretory vessels; adults in birds and mammals. *Bertiella*, p. 62.

Testicles in median field toward side of segment opposite genital pore; female glands in median field toward pore side; adults in mammals. *Anoplocephala*, p. 62.

59. Testicles in anterior portion of segment extending entirely across the median field as far as the excretory vessels; uterus a transversely elongated sac with numerous outpocketings anteriorly and posteriorly; adults in birds and mammals________________________________*Bertiella*, p. 62.

Testicles mostly in the lateral portions of the segment on both sides of the longitudinal excretory vessels, extending from the anterior to the posterior border of the segment; uterus median, bilobed, with a prolongation posteriorly on each side which crosses the longitudinal excretory vessels, and passes forward laterad of and parallel with the latter; adults in birds____*Aporina*, p. 64.

60. Cortical layer of parenchyma thin; testicles behind and at sides of female glands; adults in mammals and reptiles_____________*Oochoristica*, p. 84.

Cortical layer of parenchyma very thick; testicles dorsal, scattered throughout the entire length of the segment________________________________ 61.

61. Genital pores unilateral; genital canals pass between excretory vessels; female glands between dorsal and excretory vessels on pore side of segment; adults in birds______________________________*Zschokkeella*, p. 65.

Genital pores alternate; genital canals pass ventral of the excretory vessels; female glands submedian, only slightly displaced toward pore side of segment; adults in monotremes and marsupials_________*Linstowia*, p. 65.

62. One testicle in each segment; strobila circular in cross section with segmentation distinct only at posterior end; adults in amphibia. *Nematotænia*, p. 88.

More than one testicle in each segment______________________________ 63.

63. Uterus transversely elongated, composed of numerous ascon-like pouches, each supplied with a para-uterine organ; adults in mammals. *Thysanosoma*, p. 66.

A single and simple or bilobed uterus with a single para-uterine organ in each segment, or two uteri, each with a para-uterine organ__________ 64.

64. Two uteri in each segment, small, spherical, sac-like, one in each lateral half between the dorsal and ventral excretory vessels; testicles relatively few, in two sets, one in each side of the segment in the neighborhood of the excretory vessels; ovary small, globose, between the excretory vessels on pore side of the segment; adults in mammals___*Stilesia*, p. 89.

Uterus single and simple or bilobed; adults in birds_______________ 65.

65. Testicles dorsal of female glands and toward anterior border of segment; genital canals pass ventral of excretory vessels; uterus simple, sac-like, commonly displaced toward side of segment opposite genital pore. *Anonchotænia*, p. 86.

Testicles in posterior portion of segment, behind the female glands, may also extend forward along sides of latter; genital canals pass between excretory vessels ____ 66.

66. Uterus tubular and elongated longitudinally, or globular, occupying the median line of the segment_________________________*Rhabdometra*, p. 86.

Uterus when fully developed consisting of two spherical sacs touching in the median line and more or less fused_____________*Metroliasthes*, p. 87.

67. Para-uterine organs present_______________________________________ 68.

Para-uterine organs absent____ 69.

68. Uterus single, transversely elongated, undulating, composed of numerous ascon-like pouches, each supplied with a para-uterine organ; adults in mammals_____________________________________*Thysanosoma*, p. 66.

Two small, spherical uteri in each segment, one on either side, between the dorsal and ventral excretory vessels, each with a single para-uterine organ; adults in mammals_______________________________*Stilesia*, p. 89.

69. Uterus not persistent, the eggs becoming isolated in the parenchyma mostly in the lateral fields of the segment, few in the median field; testicles in lateral fields, absent from the median field; adults in reptiles. *Pancerina*, p. 85.

Uterus persistent ---------- 70

70. Uterus single or double (one on each side of median line), transversely elongated, tubular, generally with simple anterior and posterior outpocketings; vagina ventral of cirrus pouch on both sides of segment; eggs with or without pyriform apparatus; adults in mammals and birds. *Cittotænia*, p. 63.

Two reticulate uteri which may become more or less fused with one another in the median line; vagina ventral and cirrus dorsal on right-hand side of segment, vice versa on left side; eggs with or without pyriform apparatus; adults in mammals and birds ---------- *Moniezia*, p. 64.

DIAGNOSES OF FAMILIES, SUBFAMILIES, AND GENERA, AND LISTS OF SPECIES OCCURRING IN NORTH AMERICAN BIRDS.

Under each genus are listed the species which have been reported as parasites of North American birds, and references are given to articles in which descriptions of these forms may be found. Species which have been collected in this country, and of which I have examined specimens, are indicated by an asterisk, and the names of hosts from which such specimens were collected are indicated in a similar manner. Among the hosts are included a number of species which are not North American, comprising (1) forms which have been introduced, such as the English sparrow and various game birds, (2) forms which are present in this country in the domesticated state, and (3) forms which are represented in the North American fauna by varieties or subspecies.

Family TETRABOTHRIIDÆ.

Tetrabothridæ DIESING, 1850, in part.

Family diagnosis.—Tænioidea: Scolex unarmed, without rostellum. Suckers with an outwardly projecting auricular appendage on the anterior border. Neck short. Segments of the strobila, with the exception of the hindermost segments, always much broader than long. A single set of reproductive organs in each segment. Genital pores unilateral. Genital cloaca deep. Cirrus pouch small and nearly spherical, united with the genital cloaca by a muscular cloacal canal. Yolk gland in front of the ovary. Eggs with three transparent envelopes. Adults in birds and mammals.

Type-genus.—*Tetrabothrius* Rudolphi, 1819.

Genus TETRABOTHRIUS Rudolphi, 1819.

Amphoterocotyle DIESING, 1863 (type, *A. elegans* DIESING, 1863).
Prosthecocotyle MONTICELLI, 1892 (type, *Tænia forsteri* KREFFT, 1871).
Bothridiotænia LÖNNBERG, 1896 (type, *Tænia erostris*, LÖNNBERG, 1889).

Generic diagnosis.—Tetrabothriidæ: With the characters of the family.

Type-species.—*Bothriocephalus macrocephalus* Rudolphi, 1810.

TETRABOTHRIUS ARCTICUS Linstow, 1901.

For description see LINSTOW, 1901e, pp. 285–286, fig. 42.

Host.—*Somateria mollissima.*

TETRABOTHRIUS CYLINDRACEUS (Rudolphi, 1819) Diesing, 1850.

For description see FUHRMANN, 1899b, pp. 872–873 (*Prosthecocotyle cylindracea*).

Hosts.—*Rissa tridactyla*, *Larus hyperboreus*, *Larus marinus*, *Larus argentatus*, *Larus canus*, *Larus atricilla*, *Xema sabini*, *Sterna maxima*, *Uria troile.*

TETRABOTHRIUS DIOMEDEÆ (Fuhrmann, 1900).

For description see SHIPLEY, 1900c, pp. 557–558, pl. 56, figs. 27–29 (*Prosthecocotyle diomedeæ*).

Host.—*Diomedea exulans.*

TETRABOTHRIUS EROSTRIS (Lönnberg, 1889).

For description see FUHRMANN, 1899b, pp. 871–872 (*Prosthecocotyle erostris*).

Hosts.—*Rissa tridactyla*, *Larus marinus*, *Larus argentatus*, *Larus canus*, *Sterna hirundo*, *Sterna paradisæa.*

TETRABOTHRIUS HETEROCLITUS Diesing, 1850.

For description see FUHRMANN, 1899b, p. 874 (*Prosthecocotyle heteroclita*); 1899c, pp. 648–650, figs. 4–8 (*Prosthecocotyle heteroclita*).

Hosts.—*Puffinus puffinus*, *Puffinus kuhli*, *Priocella glacialoides*, *Daption capensis*, *Diomedea exulans*, *Diomedea albatrus.*

TETRABOTHRIUS MACROCEPHALUS Rudolphi, 1819.

For description see FUHRMANN, 1899b, pp. 873–874 (*Prosthecocotyle macrocephala*).

Hosts.—*Gavia stellata*, *Gavia arctica*, *Gavia immer*, *Colymbus auritus.*

TETRABOTHRIUS MONTICELLII (Fuhrmann, 1899).

For description see FUHRMANN, 1899b, p. 870 (*Prosthecocotyle monticellii*).

Host.—*Fulmarus glacialis.*

TETRABOTHRIUS PELECANI Fuhrmann, 1908.

For description see FUHRMANN, 1899b, pp. 875–876 (*Prosthecocotyle pelecani aquilæ*).

Hosts.—*Sula leucogastra*, *?Fregata aquila.*

TETRABOTHRIUS PORRIGENS Molin, 1858.

For description see MOLIN, 1861c, p. 237, pl. 5, figs. 18, 19 (*Tetrabothrium* (*Orygmathobothrium*) *porrigens*).

Host.—*Nycticorax nycticorax.*

TETRABOTHRIUS TORULOSUS Linstow, 1888.

For description see FUHRMANN, 1899c, pp. 643–648, figs. 1–3 (*Prosthecocotyle torulosa*).

Host.—*Diomedea albatrus.*

TETRABOTHRIUS UMBRELLA (Fuhrmann, 1899) Fuhrmann, 1908.

For description see FUHRMANN, 1899b, p. 871 (*Prosthecocotyle umbrella*).

Hosts.—Diomedea exulans, Phœbetria palpebrata.

TETRABOTHRIUS, species.

Listed by FUHRMANN, 1908a, p. 136.

Host.—Sula bassana.

Family MESOCESTOIDIDÆ Fuhrmann, 1907.

Mesocestoidinæ LÜHE, 1894.
Mesocestoidæ ARIOLA, 1899.

Family diagnosis.—Tænioidea: Scolex without rostellum or hooks. Suckers unarmed. A single set of reproductive organs in each segment. Genital pores located in the ventral surface of the segment. Vagina opens in front of or beside the cirrus pouch. Eggs in gravid segments inclosed in a single thick-walled egg-capsule. Adults in mammals and birds.

Type-genus.—Mesocestoides Vaillant, 1863.

Genus MESOCESTOIDES Vaillant, 1863.

Monodoridium WALTER, 1866 (type, *Tænia utriculifera* WALTER, 1866).
Ptychophysa HAMANN, 1885 (type, *Tænia canis-lagopodis* RUDOLPHI, 1810).

Generic diagnosis.—Mesocestoididæ: With the characters of the family. Adults in mammals and birds.

Type-species.—Mesocestoides ambiguus Vaillant, 1863.

MESOCESTOIDES ALAUDÆ Stossich, 1896.

For description see STOSSICH, 1896a, p. 133.

Host.—Alauda arvensis.

MESOCESTOIDES PERLATUS (Goeze, 1782) Mühling, 1898.

For description see MÜHLING, 1898b, pp. 105–108.—VOLZ, 1900, pp. 156–157.

Hosts.—Cerchneis tinnunculus, Aquila chrysaëtos.

Family ANOPLOCEPHALIDÆ Fuhrmann, 1907.

Family diagnosis.—Tænioidea: Scolex unarmed, without rostellum. Suckers relatively large, unarmed. Neck absent. Segments usually broader than long. A single or double set of reproductive organs in each segment. Genital pores marginal and bilateral, unilateral, or irregularly alternate or (?) absent. Testicles numerous or rarely (*Triplotænia*) one in each lateral half of the segment. Median axis of female glands lateral of the median axis of the segment. Uterus persistent, and transversely elongated, either tubular, sac-like, branched or reticular; or not persistent, replaced by egg capsules whose formation may or may not be preceded by the appearance of para-uterine organs. Egg with thin transparent shells with or without a pyriform apparatus. Adults in mammals and birds.

Type-genus.—Anoplocephala E. Blanchard, 1848.

Subfamily ANOPLOCEPHALINÆ Blanchard, 1891.

Subfamily diagnosis.—Anoplocephalidæ: Uterus persistent and tubular, sac-like, branched or reticular. Adults in mammals and birds.

Type-genus.—*Anoplocephala* E. Blanchard, 1848.

Genus TRIPLOTÆNIA Boas, 1902.

Generic diagnosis.—Anoplocephalinæ: Segmentation of strobila not apparent externally. One ovary, yolk gland, and testicle in each lateral half[a] of the segment, near the border in the neighborhood of the longitudinal excretory vessels and nerve. One vagina in each lateral half of the segment. Four to five cirrus pouches in each lateral half of the segment. Uterus, one in each lateral half of the gravid segment, sac-like, transversely elongated. Egg with well-developed pyriform apparatus, the horns of which are prolonged in two coiled filaments. Adults in marsupials.

Type-species.—*Triplotænia mirabilis* Boas, 1902.

Genus ANOPLOCEPHALA E. Blanchard, 1848.

Plagiotænia PETERS, 1871 (type, *Tænia gigantea* Peters, 1857).

Generic diagnosis.—Anoplocephalinæ: Segments generally much broader than long, occasionally longer than broad. A single set of reproductive organs in each segment. Genital pores unilateral or irregularly alternate. Genital canals pass on the dorsal side of the longitudinal excretory vessels and nerve. Testicles and female glands in the median field; female glands toward the pore side of the segment, testicles toward the opposite side. Uterus a transversely elongated sac with pocket-like appendages, anteriorly and posteriorly. Eggs with well-developed pyriform apparatus. Adults in mammals.

Type-species.—*Anoplocephala perfoliata* (Goeze, 1782) E. Blanchard, 1848.

Genus BERTIELLA Stiles and Hassall, 1902.

Bertia BLANCHARD, 1891 (homonym of *Bertia* ANCEY, 1888, mollusk).

Generic diagnosis.—Anoplocephalinæ: Segments always broader than long. A single set of reproductive organs in each segment. Genital pores regularly or irregularly alternate. Genital canals pass dorsal of longitudinal excretory vessels and usually dorsal of nerve.

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[a] The specimens on which the species *Triplotænia mirabilis* was based each consisted of a head to which apparently two strobilæ were attached. Janicki (1906), however, has shown that this condition is probably teratological, and that the double strobila represents the separated lateral halves of a single strobila.

Testicles dorsal and anterior, extending in an unbroken mass from one side of the median field of the segment to the other as far as the excretory vessels. Uterus transversely elongated with numerous outpocketings, anteriorly and posteriorly. Eggs with or without pyriform apparatus. Adults in birds and mammals.

Type-species.—Bertiella studeri (Blanchard, 1891) Stiles and Hassall, 1902.

BERTIELLA DELAFONDI (Railliet, 1892).

For description see STILES, 1896b, p. 57, pl. 20, figs. 257–262 (*Tænia, delafondi*).—FUHRMANN, 1902i, pp. 132–135, figs. 13, 14 (*Bertia delafondi*.—WOLFFHÜGEL, 1904a, pp. 45–48, figs. 1–4 (*Bertia delafondi*).

Hosts.—Columba livia, Columba livia domestica.

Genus ANDRYA Railliet, 1893.

Generic diagnosis.—Anoplocephalinæ: Segments broader than long or as long as broad. A single set of reproductive organs in each segment. Genital pores irregularly alternate, but mostly upon the same side of the strobila. Testicles in median field. A distinct round or elongated pedunculated prostatic gland near ventral excretory vessel on pore side of median field. Female glands in the median field on the pore side of the median line. Uterus net-like, with forked processes, occasionally somewhat sac-like. Eggs with pyriform apparatus, the horns of which are rather short. Adults in mammals.

Type-species.—Andrya rhopalocephala (Riehm, 1881) Stiles, 1895.

Genus CITTOTÆNIA Riehm, 1881.

Ctenotænia RAILLIET, 1893 (type, *Tænia marmotæ* FRÖLICH, 1802).
Cœlodela SHIPLEY, 1900 (type, *Cœlodela kuvaria* SHIPLEY, 1900; see FUHRMANN, 1902i, p. 142).

Generic diagnosis.—Anoplocephalinæ: Segments broader than long. Two sets of reproductive organs in each segment. Genital pores bilateral. Genital canals pass dorsal of longitudinal excretory vessels and nerves. Interproglottidal glands absent. Vagina ventral of cirrus pouch on both sides of segment. Uterus single or double (one on each side of median line), transversely elongated, tubular, generally with simple anterior and posterior outpocketings. Eggs with well-developed pyriform apparatus, the horns of which are long, crossing each other, or in some cases without this apparatus (see Fuhrmann, 1902i, p. 142, *Cittotænia kuvaria*). Adults in mammals and birds.

Type-species.—Cittotænia latissima Riehm, 1881=*Cittotænia denticulata* (Rudolphi, 1804) Stiles and Hassall, 1896.

Genus MONIEZIA Blanchard, 1891.

Paronia DIAMARE, 1900 (type, *P. carrinoi* DIAMARE, 1900; see FUHRMANN, 1907a, p. 295).

Generic diagnosis.—Anoplocephalinæ: Segments generally broader than long. Two sets of reproductive organs in each segment with two reticulate uteri which may become more or less fused with one another in the median line. Genital pores bilateral. Genital canals cross on dorsal side of longitudinal excretory vessels and nerves. Interproglottidal glands generally present. Vagina ventral and cirrus dorsal on right side of segment; the reverse on left side. Eggs with three shells and with well-developed pyriform apparatus, the horns of which generally end in a disk, or (in species from birds) without pyriform apparatus. Adults in mammals and birds.

Type-species.—*Moniezia expansa* (Rudolphi, 1810) Blanchard, 1891.

Genus SCHIZOTÆNIA Janicki, 1904.

Generic diagnosis.—Anoplocephalinæ: Segments broader than long. A single set of reproductive organs in each segment. Genital pores alternate. Genital canals pass dorsal of the longitudinal excretory vessels and nerve. Testicles near the posterior border of the segment in a group extending from the longitudinal excretory vessels of one side to those of the other. Cirrus pouch very muscular. Female glands almost median, their longitudinal axis but slightly displaced toward the genital pore. Extreme lateral portions of the uterus become functional early as sac-like enlargements; remainder of uterus develops as a complicated system of irregular lacunæ. Eggs with pyriform apparatus. Adults in mammals.

Type-species.—*Tænia decrescens* Diesing, 1856 (not *T. decrescens* Creplin, 1849).

Genus APORINA Fuhrmann, 1902.

Generic diagnosis.—Anoplocephalinæ: A single set of reproductive organs in each segment. Genital pores (?) absent. Female glands near the side toward which the vagina runs. Testicles dorsal, very numerous, mostly in the lateral portions of the segment on both sides of the longitudinal excretory vessels, extending from the anterior to the posterior border of the segment; very few in the median field. Vagina and rudimentary cirrus pouch (? without external openings). irregularly alternate on right or left side of the strobila, pass dorsal of the excretory vessels and unite with one another in the lateral field of the segment. Uterus median, bilobed, with a prolongation posteriorly on each side, which crosses the longitudinal excretory vessels, and passes forward outside of and parallel with the latter. Eggs with two shells without pyriform apparatus. Adults in birds.

Type-species.—*Aporina alba* Fuhrmann, 1902.

Subfamily LINSTOWINÆ Fuhrmann, 1907.

Subfamily diagnosis.—Anoplocephalidæ: A single set of reproductive organs in each segment. Uterus breaks down into egg capsules. Adults in mammals and birds.

Type-genus.—*Linstowia* Zschokke, 1898.

Genus LINSTOWIA Zschokke, 1898.

Generic diagnosis.—Linstowinæ: Segments broader than long. Cortical parenchyma greatly increased in thickness, medullary parenchyma correspondingly reduced. Dorsal longitudinal excretory vessels along the outer side of the ventral vessels. Genital pores alternate. Genital canals pass ventral of the excretory vessels and nerve. Testicles dorsal, scattered throughout the entire length of the segment. Female glands submedian, only slightly displaced toward the pore side of the segment. Uterus a thin-walled folded tube, disappearing early, the eggs becoming inclosed singly in egg capsules. Eggs without pyriform apparatus. Adults in monotremes and marsupials.

Type-species.—*Tænia echidnæ* W. Thompson, 1893.

Genus ZSCHOKKEELLA, new name.

Linstowia (in part) (see FUHRMANN, 1902i, p. 138).
Zschokkia [a] FUHRMANN, 1902.
Zschokkea [b] FUHRMANN, 1902 (homonymous with *Zschokkea* KOENIKE, 1892,[c] a genus of mites).

Generic diagnosis.—Linstowinæ: Segments much broader than long. Cortical parenchyma and musculature greatly developed. Dorsal excretory vessel lateral of ventral vessel. A fine capillary network in the periphery of the cortical parenchyma connects all four excretory vessels. Genital pores unilateral. Genital canals pass dorsal of the nerve, and ventral of the dorsal excretory vessel. Cirrus pouch weakly developed. Testicles dorsal scattered through the entire length of the segment. Female reproductive glands toward pore side of the segment between dorsal and ventral excretory vessels. Uterus early breaks down into egg capsules. Adults in birds.

Type-species.—*Zschokkeella linstowii* (Parona, 1885).

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[a] Fuhrmann, 1902i, p. 138, apparently a misprint for *Zschokkea*.

[b] Fuhrmann, 1902i, p. 140.

[c] Zool. Anz., vol. 15, pp. 320-321.

Subfamily THYSANOSOMINÆ Fuhrmann, 1907.

Subfamily diagnosis.—Anoplocephalidæ: Uterus transversely elongated consisting of several or numerous communicating sacs with parenchymatous para-uterine organs, into which the eggs probably pass in the oldest segments. Adults in mammals.

Type-genus.—*Thysanosoma* Diesing, 1835.

Genus THYSANOSOMA Diesing, 1835.

Generic diagnosis.—Thysanosominæ: Segments much broader than long, end segments only showing a tendency to become longer and narrower. A double set of reproductive organs but only a single uterus in each segment, with opposite or with irregularly alternating pores, those of one side, with the corresponding cirrus pouch, ovary, and vagina having been suppressed. Genital canals pass between the longitudinal excretory vessels, and dorsal of the nerve. Uterus transverse, undulating, composed of numerous ascon-like pouches each supplied with a parauterine organ. Horns of pyriform apparatus absent. Adults in mammals (ruminants).

Type-species.—*Thysanosoma actinioides* Diesing, 1835.

Family DAVAINEIDÆ Fuhrmann, 1907.

Family diagnosis.—Tænioidea: Scolex with simple rostellum, armed with double row (rarely a single row) of very numerous (and generally very small) hammer-shaped hooks. Suckers armed or, rarely, unarmed. A single or double set of reproductive organs in each segment. Genital pores marginal, and bilateral, unilateral, or irregularly alternating. Uterus sac-like, persistent; or sac-like or branched, not persistent, replaced either by numerous egg capsules, or by a single egg capsule whose formation is preceded by the appearance of a para-uterine organ. Egg with thin transparent shells. Adults in mammals and birds.

Type-species.—*Davainea* Blanchard and Railliet, 1891.

Subfamily OPHRYOCOTYLINÆ Fuhrmann, 1907.

Subfamily diagnosis.—Davaineidæ: Rostellum,[a] very broad, armed with a double row of hooks on border. Surface of suckers armed only near the anterior border. A single set of reproductive organs

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[a] Fuhrmann (1908a, p. 41) has found that the apical structure, with five depressions, which has been described in different species of *Ophryocotyle*, is really a rostellum with an anterior enlargement which in certain stages of contraction presents the peculiar appearance noticed by various authors.

in each segment. Genital pores irregularly alternate. Uterus sac-like, slightly bilobed, persistent. Adults in birds.

Type-genus.—Ophryocotyle Friis, 1870.

Genus OPHRYOCOTYLE Friis, 1870.

Generic diagnosis.—Ophryocotylinæ: With the characters of the subfamily.

Type-species.—Ophryocotyle proteus Friis, 1870.

OPHRYOCOTYLE INSIGNIS Lönnberg, 1890.

For description see Lönnberg, 1890b, pp. 15–18.—Blanchard, 1891t, pp. 442–443.—Fuhrmann, 1909, pp. 94–97, figs. 1, 2, 4–6.

Host.—Hæmatopus ostralegus.

OPHRYOCOTYLE PROTEUS Friis, 1870.

For description see Blanchard, 1891t, pp. 440–442, fig. 20.—Stiles, 1896f, p. 56, pl. 19, figs. 252–255.—Fuhrmann, 1909, fig. 3.

Hosts.—Ægialitis hiaticula, Calidris leucophæa, Erolia ferruginea, Pelidna alpina, Larus canus.

OPHRYOCOTYLE, species Lönnberg.

Listed by Fuhrmann, 1908a, p. 159.

Host.—Mergus serrator.

Subfamily DAVAINEINÆ Braun, 1900.

Subfamily diagnosis.—Davaineidæ: Suckers armed around the periphery with several rings of hooklets which are unstable or persistent. Uterus breaks down into numerous egg capsules, each containing one or more eggs. Para-uterine organs not present. Adults in mammals and birds.

Type-genus.—Davainea Blanchard and Railliet, 1891.

Genus DAVAINEA Blanchard and Railliet, 1891.

Bothriotænia, Railliet, 1892 (type, *Dibothrium longicolle* Molin, 1858; see Lühe, 1899c, p. 40).

Generic diagnosis.—Davaineinæ: A single set of reproductive organs in each segment. Genital pores unilateral or occasionally irregularly alternate. Uterus breaks down into egg capsules each containing one or several eggs. Adults in mammals and birds.

Type-species.—Davainea proglottina (Davaine, 1860) Blanchard, 1891.

DAVAINEA ANATINA Fuhrmann, 1908.

For description see Fuhrmann, 1909, p. 107, fig. 16.

Host.—Anas platyrhynchos domestica.

***DAVAINEA CESTICILLUS (Molin, 1858) Blanchard, 1891.**

For description see Ransom, 1905b, pp. 283–285, figs. 8, 14, 18, 26, 32.

*Hosts.—*Meleagris galllopavo domestica, *Gallus gallus domesticus.*

DAVAINEA CIRCUMVALLATA (Krabbe, 1869) Blanchard, 1891.

For description see KRABBE, 1869b, p. 343, pl. 10, fig. 295 (*Tænia circumvallata*).—BLANCHARD, 1891t, p. 434, fig. 10.—STILES, 1896f, pp. 47-48, pl. 16, figs. 203–211.—MOLA, 1907, pp. 126–130, figs. 1–7.

Host.—Coturnix coturnix.

*** DAVAINEA COMITATA Ransom, 1909.**

For description see RANSOM, 1909, pp. 15–18, figs. 5–8 (the present paper).

*Hosts.—*Colaptes auratus, *Melanerpes erythrocephalus.*

DAVAINEA CRASSULA (Rudolphi, 1819) Railliet, 1893.

For description see KRABBE, 1869b, pp. 345–346, pl. 10, fig. 301 (*Tænia crassula*); 1882a, p. 363, pl. 2, figs. 66, 67 (*T. crassula*).—STILES, 1896f, pp. 53–54, pl. 18, figs. 243–246.—FUHRMANN, 1909, p. 104, fig. 13.

Hosts.—Columba livia, Columba livia domestica.

*** DAVAINEA ECHINOBOTHRIDA (Mégnin, 1880) Blanchard, 1891.**

For description see RANSOM, 1904b, pp. 55–65, figs. 42, 44, 46, 48, 50, 52; 1905b, pp. 279–283, figs. 6, 7, 13, 17, 20, 25, 31.

Host.— Gallus gallus domesticus.*

DAVAINEA FRIEDBERGERI (Linstow, 1878) Blanchard, 1891.

For description see STILES, 1896f, pp. 52–53, pl. 18, figs. 236–242.

Host.—Phasianus colchicus.

(? DAVAINEA) LONGICOLLIS (Molin, 1858).

For description see STILES, 1896f, pp. 26–27 (*Bothriotænia longicollis*).

Host.—Gallus gallus domesticus.

DAVAINEA MUTABILIS [a] Rüther, 1901.

For description see RÜTHER, 1901b, pp. 353–357, 362–364, figs. 1–12.

Host.—Gallus gallus domesticus.

DAVAINEA PARAECHINOBOTHRIDA [b] Magalhães, 1893.

For description see MAGALHÃES, 1898c, pp. 442–443, 444.

Host.—Gallus gallus domesticus.

DAVAINEA POLYUTERINA Fuhrmann, 1908.

For description see FUHRMANN, 1909, p. 103.

Host.—Coturnix coturnix.

*** DAVAINEA PROGLOTTINA [c] (Davaine, 1860) Blanchard, 1891.**

For description see STILES, 1896f, p. 47, pl. 15, figs. 194–198; pl. 16, figs. 199 202.

Host.— Gallus gallus domesticus.*

*** DAVAINEA RHYNCHOTA Ransom, 1909.**

For description see RANSOM, 1909, pp. 10–15, figs. 1–4 (the present paper).

*Hosts. *Colaptes auratus, *Melanerpes erythrocephalus.*

*** DAVAINEA TETRAGONA (Molin, 1858) Blanchard, 1891.**

For description see RANSOM, 1904b, pp. 55–65, figs. 41, 43, 45, 47, 49, 51; 1905b, pp. 278 279, figs. 5, 12, 16, 19, 24, 30.

*Host. * Gallus gallus domesticus.*

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[a] This form is probably identical with *D. cesticillus.*

[b] This form is perhaps identical with *D. echinobothrida* or *D. tetragona.*

[c] This species has been collected in this country in Pennsylvania (Bureau of Animal Industry Collection, No. 4372) and in Maryland (Bureau of Animal Industry Collection, Nos. 1442, 14522, and 14750).

DAVAINEA VOLZI[a] Fuhrmann, 1905.

For description see FUHRMANN, 1905b, pp. 303–308, pl. 10, figs. 1–7.

Host.—*Gallus gallus domesticus.*

Genus POROGYNIA[b] Railliet and Henry, 1909.

Linstowia ZSCHOKKE, 1898 (in part; see FUHRMANN, 1907a, p. 293).
Polycœlia FUHRMANN, 1907 (homonymous with *Polycœlia* KING, 1849, Cœlenterata).

Generic diagnosis.—Davaineinæ: Scolex with simple rostellum, armed with three rows of hooks. Segments much broader than long. Cortical parenchyma and longitudinal musculature greatly developed. Dorsal excretory vessels absent. A single set of reproductive organs in each segment. Genital pores unilateral. Genital canals pass dorsal of the longitudinal ventral excretory vessel and nerve. Testicles numerous. Female glands on the pore side of the median line, near the ventral excretory vessel. Yolk gland between the ovary and median line. Uterus with very thin walls, which early disappear. The eggs become inclosed singly in egg capsules, closely packed together filling the medullary parenchyma. Adults in birds.

Type-species.—*Porogynia lata* (Fuhrmann, 1901).

Genus COTUGNIA Diamare, 1893.

Generic diagnosis.—Davaineinæ: Segments broader than long. Several layers of longitudinal muscles alternating with layers of transverse muscle fibers. A double set of reproductive organs in each segment, close to the longitudinal excretory canals. Genital canals pass dorsal of longitudinal excretory vessels and nerve. Testicles numerous, filling the median field and extending dorsal of the female organs and excretory vessels to the extreme edge of the medullary parenchyma. Uterus breaks down, and the eggs become inclosed singly in egg capsules. Adults in birds.

Type-species.—*Cotugnia digonopora* (Pasquale, 1890) Diamare, 1893.

COTUGNIA DIGONOPORA (Pasquale, 1890) Diamare, 1893.

For description see STILES, 1896f, p. 30, pl. 1, figs. 1–11.

Host.—*Gallus gallus domesticus.*

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[a] This species is very similar to and perhaps identical with *Davainea echinobothrida.*

[b] Fuhrmann (1907a) placed the genus *Polycœlia* (=*Porogynia*) in the subfamily Dipylidiinæ, but more recently (1908a, p. 47) in the light of later knowledge concerning the anatomy of its type-species has transferred it to the subfamily Davaineinæ.

Subfamily IDIOGENINÆ Fuhrmann, 1907.

Subfamily diagnosis.—Davaineidæ: Suckers (?) unarmed. A single set of reproductive organs in each segment. Uterus not persistent, sac-like, more or less lobed or much branched. A para-uterine organ develops into which the eggs finally pass. Adults in birds.

Type-genus.—*Idiogenes* Krabbe, 1868.

Genus IDIOGENES Krabbe, 1868.

Generic diagnosis.—Idiogeninæ: Genital pores unilateral. Cirrus pouch very large, with retractor. A para-uterine organ develops in front of the uterus into which the eggs finally pass directly from the latter, and which transforms into a single egg capsule. Adults in birds.

Type-species.—*Idiogenes otidis* Krabbe, 1868.

Genus CHAPMANIA Monticelli, 1893.

Capsodavainea FUHRMANN, 1901 (type, *Capsodavainea tauricollis* (CHAPMAN, 1876) FUHRMANN, 1901).

Generic diagnosis.—Idiogeninæ: Longitudinal musculature greatly developed, consisting of several layers of muscle bundles. Genital pores unilateral. Uterus much branched, disappears, and the eggs become inclosed in numerous egg capsules, and finally are pressed into a large anteriorly located para-uterine organ, which transforms into a single egg capsule. Adults in birds.

Type-species.—*Chapmania tauricollis* (Chapman, 1876) Monticelli, 1893.

Family HYMENOLEPIDIDÆ Railliet and Henry, 1909.

"*Hymenolepidæ*" ARIOLA, 1899 (type-genus, *Hymenolepis*).
Echinocotylidæ[a] ARIOLA, 1899 (type-genus, *Echinocotyle*).
"*Dilepinidæ*" FUHRMANN, 1907 (type-genus, *Dilepis*).

Family diagnosis.—Tænioidea: Scolex with an armed rostellum, or without rostellum. Hooks on rostellum not hammer-shaped. Suckers usually unarmed. A single, or rarely, a double, set of reproductive organs in each segment. Genital pores marginal and bilateral, unilateral, or regularly or irregularly alternate. Egg with thin transparent shells. Adults in mammals, birds, reptiles, and amphibia.

Type-genus.—*Hymenolepis* Weinland, 1858.

Subfamily DIPYLIDIINÆ Stiles, 1896.

Rhynchotænia DIESING, 1850.
Malacolepidota WEINLAND, 1858.

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[a] Echinocotylidæ and Hymenolepidæ are both referred to by Ariola (1899d, p. 166) on the same page, Hymenolepidæ being mentioned first.

Cystoideæ LEUCKART, 1863.
Cystoidei LEUCKART, 1886.
Cystoidotæniæ RAILLIET, 1886.
Microtæniæ CLAUS, 1891.
Dipylidinæ RAILLIET, 1896. (See Stiles, 1906a, p. 48.)
"*Dilepininæ*" FUHRMANN, 1907.
Dilepidinæ RAILLIET and HENRY, 1909.

Subfamily diagnosis.—Hymenolepididæ: Rostellum armed, or, rarely, absent. Suckers unarmed. A single set, or rarely a double set, of reproductive organs in each segment. Uterus sac-like, simple or lobulated, or not persistent, breaking down into numerous egg capsules, each containing one or several eggs. Para-uterine organs not developed. Adults in birds, mammals, and reptiles.

Type-genus.—*Dipylidium* Leuckart, 1863.

Genus DILEPIS Weinland, 1858.

Generic diagnosis.—Dipylidiinæ: Rostellum armed with a double crown of hooks, with long dorsal and short ventral root and long blade. Inner longitudinal muscle layer consisting of numerous bundles. Genital pores unilateral. Genital canals pass dorsal of the longitudinal excretory vessels and nerve. Vas deferens coiled, seminal vesicle not developed. Testicles in medullary portion of segment surrounding the female glands at the sides and behind, typically numerous (40 to 50), but may be reduced in number (7). Uterus sac-like, with few or numerous outpocketings. Adults in birds and mammals.

Type-species.—*Tænia angulata* Rudolphi, 1810 (=*Tænia undula* Schrank, 1788, according to Cohn, 1901b, pp. 288–293).

DILEPIS ATTENUATA (Dujardin, 1845) Fuhrmann, 1908.

For description see DUJARDIN, 1845a, p. 566, pl. 9, fig. S (*Tænia attenuata*).—LINSTOW, 1875a, pp. 184–185, pl. 2, figs. 7, 8 (*Tænia attenuata*).

Hosts.—*Anthus pratensis*, *Passer domesticus*, *Passer montanus*.

DILEPIS CAPRIMULGORUM Fuhrmann, 1908.

For description see FUHRMANN, 1908b, pp. 49–50, fig. 35.

Host.—*Chordeiles virginianus*.

(? DILEPIS) CYLINDRICA Clerc, 1903.

For description see CLERC, 1903, pp. 337–339, pl. 10, figs. 48, 50, 52, 60.

Host.—*Larus canus*.

DILEPIS LIMOSA Fuhrmann, 1907.

For description see FUHRMANN, 1907b, pp. 516–517, fig. 1.

Hosts.—*Numenius phæopus*, *Limosa limosa*.

DILEPIS NYMPHOIDES Clerc, 1903.

For description see CLERC, 1903, pp. 340–341, pl. 10, fig. 70.

Host.—*Pisobia damacensis*.

DILEPIS PAPILLIFERA Fuhrmann, 1908.

For description see Fuhrmann, 1908b, pp. 48–49, figs. 33, 34.

Host.—*Florida cærulea.*

DILEPIS RETIROSTRIS (Krabbe, 1869) Zschokke, 1903.

For description see Krabbe, 1869b, pp. 282–283, pl. 5, figs. 97–99 (*Tænia retirostris*).

Hosts.—*Arenaria interpres, Pelidna alpina.*

DILEPIS SCOLECINA (Rudolphi, 1819) Fuhrmann, 1908.

For description see Krabbe, 1869b, pp. 280–281, pl. 4, figs. 88–90 (*Tænia scolecina*).

Host.—*Phalacrocorax carbo.*

*** DILEPIS TRANSFUGA[a] (Krabbe, 1869) Fuhrmann, 1908.**

For description see Krabbe, 1869b, p. 281, pl. 4, figs. 91–93 (*Tænia transfuga*).

Host.—**Ajaia ajaja.*

DILEPIS UNDULA (Schrank, 1788) Cohn, 1900.

For description see Volz, 1900, pp. 130–135, pl. 6, figs. 5, 6; pl. 7, fig. 7 (*Dilepis undulata*).

Hosts.—*Sturnus vulgaris, Turdus musicus, Pica pica, Corvus corax.*

DILEPIS UNILATERALIS[b] (Rudolphi, 1819) Clerc, 1906.

For description see Krabbe, 1869b, pp. 276–278, pl. 4, figs. 79–83 (*Tænia unilateralis*).—Clerc, 1906b, pp. 714–715, figs. 3, 4.

Hosts.—*Butorides virescens, Casmerodius egretta, Ardea cinerea.*

DILEPIS URCEUS (Wedl, 1856) Fuhrmann, 1908.

For description see Krabbe, 1869b, pp. 279–280, pl. 4, figs. 85–87 (*Tænia urceus*).

Host.—*Plegadis autumnalis.*

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[a] This species has been collected a number of times from birds (*Ajaia ajaja*) dying at the National Zoological Park, Washington, D. C. (Bureau of Animal Industry, Helminthological Collection, Nos. 4162, 4163, 4165, 4452.)

[b] This species was first described by Rudolphi (1819a, pp. 696–697). Under the caption *A. Ardeæ virescentis,* he refers to a large specimen about 7 inches long and several small specimens. The description which Rudolphi gives of these specimens indicates that the material comprised more than one species. Krabbe (1869b) redescribed and figured *Tænia unilateralis* on the basis of the small specimens in Rudolphi's original material. Fuhrmann (1906b, p. 740), who reexamined Rudolphi's material, states that the species *T. unilateralis* belongs in *Hymenolepis* and is identical with *H. ardeæ* Fuhrmann (1906b, pp. 451–452, figs. 37–39), the latter name falling as a synonym of *H. unilateralis.*

It should be noted, however, that *Hymenolepis ardeæ,* as described by Fuhrmann (1906b, p. 451), is a species of considerable size, which indicates that Fuhrmann in examining Rudolphi's material did not find the small specimens which Krabbe described as *T. unilateralis.* As the specimens from Rudolphi's collection, which Krabbe described and figured, are quite different from *Hymenolepis ardeæ,* it is evident that the type material of *Tænia unilateralis* originally represented more than one species, Krabbe having studied one form and Fuhrmann another. As Krabbe's description antedates Fuhrmann's, the species which the former author selected as *Tænia unilateralis* should retain that name, rather than the form which Fuhrmann selected. *Dilepis campylancristrota* (Wedl, 1856), which Fuhrmann (1908a, p. 52) accepts as the appropriate name for the form described by Krabbe, falls into synonymy.

Genus TRICHOCEPHALOIDES Sinitsin, 1896.

Generic diagnosis.—Dipylidiinæ: Rostellum with single crown of hooks. Genital pores unilateral, subdorsal. Testicles few, but more than four, in posterior region of segment. Uterus sac-like; eggs few. Adults in birds.

Type-species.—*Trichocephaloides inermis* Sinitsin, 1896 (= *Tænia megalocephala* Krabbe, 1869; see Fuhrmann, 1901a, p. 761, and Clerc, 1902a, p. 662).

TRICHOCEPHALOIDES MEGALOCEPHALA (Krabbe, 1869) Clerc, 1902.

For description see KRABBE, 1869b, pp. 283–284, pl. 5, figs. 100–103 (*Tænia megalocephala*).—CLERC, 1902a, pp. 662–663, fig. 5; 1903, pp. 350–353, pl. 9, fig. 33; pl. 10, fig. 57.

Hosts.—*Totanus totanus, Calidris leucophæa, Pisobia damacensis, Erolia ferruginea, Pelidna alpina, Arquatella maritima.*

Genus LATERIPORUS Fuhrmann, 1907.

Generic diagnosis.—Dipylidiinæ: Rostellum armed with a single crown of 12 to 16 hooks (120 to 170μ long), with long dorsal and short ventral root, and well-developed blade. Genital pores unilateral. Genital canals pass dorsal of the longitudinal excretory vessels. Testicles 12 to 30 in number, behind, or at the sides of, the female glands. Uterus sac-like, filling the entire medullary parenchyma in gravid segments. Adults in birds.

Type-species.[a]—*Lateriporus teres* (Krabbe, 1869) Fuhrmann, 1907.

LATERIPORUS BIUTERINUS Fuhrmann, 1908.

For description see FUHRMANN, 1908b, pp. 56–58, figs. 44–46.

Hosts.—*Oidemia fusca, Cairina moschata, Dendrocygna autumnalis.*

LATERIPORUS TERES (Krabbe, 1869) Fuhrmann, 1907.

For description see KRABBE, 1869b, pp. 284–285, pl. 5, figs. 106–108 (*Tænia teres*).—FUHRMANN, 1907b, pp 521–523, figs. 13–15.

Hosts.—*Somateria mollissima, Harelda hyemalis.*

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[a] Fuhrmann in his original publication on this genus (1907b, p. 521) did not select a type-species. He refers only to two species *Lateriporus teres* (Krabbe) and *Lateriporus propeteres* Fuhrmann, hence one of these under the International Code of Nomenclature must be the type. Fuhrmann (1908b, p. 54; 1908a, p. 53) has selected *L. spinosus* Fuhrmann, 1908, as type, a selection which evidently can not stand, since this species is not one of the original species of the genus.

Genus CHOANOTÆNIA[a] Railliet, 1896.

Monopylidium Fuhrmann, 1899 (type, *Davainea musculosa* Fuhrmann, 1896; in part).

Icterotænia Railliet and Henry, 1909 (in part).

Generic diagnosis.—Dipylidiinæ: Rostellum armed with a single crown of hooks usually with long dorsal and short ventral root. Segments numerous, rarely less than 30. Genital pores irregularly alternate near the anterior border of the segment. Genital canals pass between the longitudinal excretory vessels and dorsal of the nerve. Vas deferens coiled, seminal vesicle absent. Testicles numerous, in the posterior region of the segment, or, also, laterally on each side of the female glands. Uterus persistent, sac-like, but may be subdivided into numerous small communicating chambers incompletely separated by partitions infolded from the wall of the uterus, so that in some cases the eggs appear almost as if isolated in the parenchyma. Adults in birds and mammals.

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[a] Although Fuhrmann (1908a, 1907a) and Clerc (1903) recognize *Monopylidium* and *Choanotænia* as distinct genera, they would place *Ch. infundibuliformis*, the type of *Choanotænia* in *Monopylidium*, and Fuhrmann (1908a) has selected *Choanotænia galbulæ* (Zeder, 1803) as a new type for *Choanotænia*. This arrangement, as has been pointed out by Railliet and Henry (1909, p. 338), is in violation of the law of priority of the International Code of Zoological Nomenclature, inasmuch as a type once fixed can not be changed. *Monopylidium* must fall into synonymy if *Ch. infundibuliformis* (type of *Choanotænia*) is made congeneric with *Monopylidium musculosum* (type of *Monopylidium*), *Choanotænia* (1893) being of date prior to that of *Monopylidium* (1899). If, as Clerc and Fuhrmann believe, *Ch. infundibuliformis* and *M. musculosum* should go into the same genus, that genus must be known as *Choanotænia*, not as *Monopylidium*. Such action would leave the genus *Choanotænia* of Fuhrmann (not Railliet) without a name, and it would become necessary to rename the genus. This Railliet and Henry (1909, p. 338) have done, proposing the name *Icterotænia* for the species "*Icterotænia galbulæ, porosa, parina*, etc." Until, however, a more careful comparative study of the various species of *Monopylidium* and *Choanotænia*, especially the type species of the two genera, has been made I believe it justifiable to recognize both these generic names; notwithstanding this necessitates the separation of *Choanotænia infundibuliformis* and *Monopylidium musculosum*, which Clerc and Fuhrmann would place together. I am inclined to doubt that the uterus of the former species breaks down into egg capsules as Clerc (1903) has stated. My own observations support those of Cohn (1901b), who affirms that the uterus is persistent, and possesses an irregularly lobulated cavity incompletely subdivided by infoldings from the wall. If this is true, and if no later development of egg capsules occurs, *Choanotænia infundibuliformis* differs from *Monopylidium*, in which the uterus is said to break down into egg capsules, and it is therefore possible to recognize both *Choanotænia* and *Monopylidium* changing but slightly Fuhrmann's arrangement of species, namely removing *Choanotænia infundibuliformis* from *Monopylidium* to *Choanotænia*, where it belongs. I have not considered the differences between *Monopylidium* and such genera as *Choanotænia*, and *Anomotænia*, sufficiently marked to warrant placing them in different subfamilies, as Fuhrmann (1907a, 1908a) has done. *Monopylidium*, in spite of the breaking down of the uterus, seems to me much more closely related to the genera named than to *Dipylidium*, with which Fuhrmann has united it in a subfamily separate from the others.

Type-species.—*Choanotænia infundibuliformis*[a] (Goeze, 1782) Railliet, 1896 = *Tænia infundibulum* Bloch, 1779.

CHOANOTÆNIA BILATERALIS Fuhrmann, 1908.

For description see FUHRMANN, 1908a, pp. 32–33, figs. 9, 10.

Host.—*Colymbus dominicus.*

CHOANOTÆNIA BOREALIS (Linstow, 1905) Fuhrmann, 1908.

For description see LINSTOW, 1905dd, pp. 11–12, pl. 2, fig. 41; pl. 3, figs. 42, 43 (*Aporina borealis*).—FUHRMANN, 1908a, p. 55.

Host.—*Harelda hyemalis.*

CHOANOTÆNIA CORONATA (Creplin, 1829) Fuhrmann, 1908.

For description see KRABBE, 1869b, pp. 275–276, pl. 3, figs. 74–76 (*Tænia coronata*).

Host.—*Ægialitis nivosa.*

CHOANOTÆNIA DODECACANTHA (Krabbe, 1869) Fuhrmann, 1908.

For description see KRABBE, 1869b, p. 261, pl. 1, figs. 14, 15 (*Tænia dodecacantha*).

Host.—*Larus minutus.*

CHOANOTÆNIA EMBRYO (Krabbe, 1869) Fuhrmann, 1908.

For description see KRABBE, 1869b, pp. 273–274, pl. 3, figs. 65, 66 (*Tænia embryo*).

Hosts.—*Gallinago gallinago, Scolopax rusticola.*

* **CHOANOTÆNIA INFUNDIBULUM** (Bloch, 1779) Cohn, 1899.

For description see COHN, 1901b, pp. 365–368, pl. 31, fig. 46; pl. 32, fig. 47.—CLERC, 1903, pp. 354–356, pl. 11, figs. 72, 74–76, 83 (*Monopylidium infundibuliformis*).—RANSOM, 1905b, pp. 276–277, figs. 4, 11, 15, 23, 29 (*Choanotænia infundibuliformis*).

Hosts.—* *Gallus gallus domesticus, Phasianus colchicus, Coturnix coturnix.*

CHOANOTÆNIA INVERSA (Rudolphi, 1819) Fuhrmann, 1908.

For description see RUDOLPHI, 1819a, pp. 156, 510–511 (*Tænia inversa*).—VILLOT 1875, p. 475, pl. 12, fig. 8 (*Tænia inversa*).

Host.—*Sterna paradisæa.*

CHOANOTÆNIA LÆVIGATA (Rudolphi, 1819) Clerc, 1906.

For description see KRABBE, 1869b, p. 275, pl. 3, figs. 71–73 (*Tænia lævigata*).—CLERC, 1906b, pp. 719–720, figs. 16, 17.

Hosts.—*Charadrius apricarius, Ægialitis hiaticula, Ægialitis nivosa.*

CHOANOTÆNIA PARADOXA (Rudolphi, 1802) Clerc, 1903.

For description see KRABBE, 1869b, pp. 274–275, pl. 3, figs. 69, 70 (*Tænia paradoxa*).—CLERC, 1903, pp. 327–332, pl. 10, figs. 53, 55, 61, 62.

Hosts.—*Hæmatopus ostralegus, Charadrius apricarius, Erolia ferruginea, Gallinago gallinago, Scolopax rusticola, Lobipes lobatus.*

CHOANOTÆNIA PARINA (Dujardin, 1845) Clerc, 1906.

For description see DUJARDIN, 1845a, p. 598, pl. 9, fig. E (*Tænia parina*).—KRABBE, 1869b, pp. 341–342, pl. 10, figs. 291, 292 (*Tænia parina*).—CLERC, 1906b, p. 719, fig. 15.

Hosts.—*Passer domesticus, Passer montanus, ? Sturnus vulgaris.*

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[a] According to the law of priority the correct name of this species is *Choanotænia infundibulum* (Bloch, 1779).

Subfamily THYSANOSOMINÆ Fuhrmann, 1907.

Subfamily diagnosis.—Anoplocephalidæ: Uterus transversely elongated consisting of several or numerous communicating sacs with parenchymatous para-uterine organs, into which the eggs probably pass in the oldest segments. Adults in mammals.

Type-genus.—*Thysanosoma* Diesing, 1835.

Genus THYSANOSOMA Diesing, 1835.

Generic diagnosis.—Thysanosominæ: Segments much broader than long, end segments only showing a tendency to become longer and narrower. A double set of reproductive organs but only a single uterus in each segment, with opposite or with irregularly alternating pores, those of one side, with the corresponding cirrus pouch, ovary. and vagina having been suppressed. Genital canals pass between the longitudinal excretory vessels, and dorsal of the nerve. Uterus transverse, undulating, composed of numerous ascon-like pouches each supplied with a parauterine organ. Horns of pyriform apparatus absent. Adults in mammals (ruminants).

Type-species.—*Thysanosoma actinioides* Diesing, 1835.

Family DAVAINEIDÆ Fuhrmann, 1907.

Family diagnosis.—Tænioidea: Scolex with simple rostellum, armed with double row (rarely a single row) of very numerous (and generally very small) hammer-shaped hooks. Suckers armed or, rarely, unarmed. A single or double set of reproductive organs in each segment. Genital pores marginal, and bilateral, unilateral, or irregularly alternating. Uterus sac-like, persistent; or sac-like or branched, not persistent, replaced either by numerous egg capsules, or by a single egg capsule whose formation is preceded by the appearance of a para-uterine organ. Egg with thin transparent shells. Adults in mammals and birds.

Type-species.—*Davainea* Blanchard and Railliet, 1891.

Subfamily OPHRYOCOTYLINÆ Fuhrmann, 1907.

Subfamily diagnosis.—Davaineidæ: Rostellum,[a] very broad, armed with a double row of hooks on border. Surface of suckers armed only near the anterior border. A single set of reproductive organs

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[a] Fuhrmann (1908a, p. 41) has found that the apical structure, with five depressions, which has been described in different species of *Ophryocotyle*, is really a rostellum with an anterior enlargement which in certain stages of contraction presents the peculiar appearance noticed by various authors.

in each segment. Genital pores irregularly alternate. Uterus saclike, slightly bilobed, persistent. Adults in birds.

Type-genus.—Ophryocotyle Friis, 1870.

Genus OPHRYOCOTYLE Friis, 1870.

Generic diagnosis.—Ophryocotylinæ: With the characters of the subfamily.

Type-species.—Ophryocotyle proteus Friis, 1870.

OPHRYOCOTYLE INSIGNIS Lönnberg, 1890.

For description see LÖNNBERG, 1890b, pp. 15–18.—BLANCHARD, 1891t, pp. 442–443.—FUHRMANN, 1909, pp. 94–97, figs. 1, 2, 4–6.

Host.—Hæmatopus ostralegus.

OPHRYOCOTYLE PROTEUS Friis, 1870.

For description see BLANCHARD, 1891t, pp. 440–442, fig. 20.—STILES, 1896f, p. 56, pl. 19, figs. 252–255.—FUHRMANN, 1909, fig. 3.

Hosts.—Ægialitis hiaticula, Calidris leucophæa, Erolia ferruginea, Pelidna alpina, Larus canus.

OPHRYOCOTYLE, species Lönnberg.

Listed by FUHRMANN, 1908a, p. 159.

Host.—Mergus serrator.

Subfamily DAVAINEINÆ Braun, 1900.

Subfamily diagnosis.—Davaineidæ: Suckers armed around the periphery with several rings of hooklets which are unstable or persistent. Uterus breaks down into numerous egg capsules, each containing one or more eggs. Para-uterine organs not present. Adults in mammals and birds.

Type-genus.—Davainea Blanchard and Railliet, 1891.

Genus DAVAINEA Blanchard and Railliet, 1891.

Bothriotænia, RAILLIET, 1892 (type, *Dibothrium longicolle* MOLIN, 1858; see LÜHE, 1899c, p. 40).

Generic diagnosis.—Davaineinæ: A single set of reproductive organs in each segment. Genital pores unilateral or occasionally irregularly alternate. Uterus breaks down into egg capsules each containing one or several eggs. Adults in mammals and birds.

Type-species.—Davainea proglottina (Davaine, 1860) Blanchard, 1891.

DAVAINEA ANATINA Fuhrmann, 1908.

For description see FUHRMANN, 1909, p. 107, fig. 16.

Host.—Anas platyrhynchos domestica.

* **DAVAINEA CESTICILLUS** (Molin, 1858) Blanchard, 1891.

For description see RANSOM, 1905b, pp. 283–285, figs. 8, 14, 18, 26, 32.

*Hosts.—*Meleagris galllopavo domestica, *Gallus gallus domesticus.*

ANOMOTÆNIA CITRUS (Krabbe, 1869) Fuhrmann, 1908.

For description see KRABBE, 1869b, p. 270, pl. 2, figs. 48–50 (*Tænia citrus*).—CLERC, 1903, p. 321 (*Choanotænia citrus*).

Host.—Gallinago gallinago.

ANOMOTÆNIA CLAVIGERA (Krabbe, 1869) Cohn, 1900.

For description see KRABBE, 1869b, p. 267, pl. 2, figs. 41–43 (*Tænia clavigera*).—COHN, 1901b, p. 405.

Hosts.—Arenaria interpres, Pisobia damacensis, Pelidna alpina, Tringa canutus.

***ANOMOTÆNIA CONSTRICTA (Molin, 1858).**

For description see KRABBE, 1869b, p. 329, pl. 9, figs. 252–256 (*Tænia constricta*).—VOLZ, 1900, pp. 117–126, pl. 6, figs. 1–3 (*T. constricta*).—COHN, 1901b, pp. 405–407 (*Anomotænia puncta*).—CLERC, 1903, pp. 334–335 (*Choanotænia constricta*).

*Hosts.—Turdus musicus, *Pica pica,*[a] **Corvus ossifragus,*[b] **Corvus brachyrhynchos,*[c] *Corvus corax.*

ANOMOTÆNIA CYATHIFORMIS (Frölich, 1791) Fuhrmann, 1908.

For description see KRABBE, 1869b, pp. 330–331, pl. 9, fig. 260 (*Tænia cyathiformis*)

Host.—Riparia riparia.

ANOMOTÆNIA ERICETORUM (Krabbe, 1869) Fuhrmann, 1908.

For description see KRABBE, 1869b, pp. 270–271, pl. 3, figs. 51, 52 (*Tænia ericetorum*).

Host.—Charadrius apricarius.

ANOMOTÆNIA GLOBULUS (Wedl, 1856) Fuhrmann, 1908.

For description see KRABBE, 1869b, p. 271, pl. 3, figs. 53–55 (*Tænia globulus*).—CLERC, 1903, pp. 323-325 (*Choanotænia globulus*).

Hosts.—Helodromas ochropus, Machetes pugnax.

ANOMOTÆNIA HIRUNDINA Fuhrmann, 1907.

For description see FUHRMANN, 1907b, p. 518, figs. 5, 6.

Host.—Riparia riparia.

ANOMOTÆNIA LARINA (Krabbe, 1869) Zschokke, 1903.

For description see KRABBE, 1869b, pp. 261–262, pl. 1, figs. 16, 17 (*Tænia larina*).

Hosts.—Rissa tridactyla, Larus hyperboreus.

ANOMOTÆNIA MICRACANTHA (Krabbe, 1869) Zschokke, 1903.

For description see KRABBE, 1869b, pp. 262–263, pl. 1, figs. 18–21 (*Tænia micracantha*).

Hosts.—Pagophila alba, Rissa tridactyla, Larus hyperboreus, Larus marinus, Larus canus, Cepphus grylle.

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[a] Bureau of Animal Industry Helminthological Collection, No. 3656 from *Pica pica hudsonia*, Montana.

[b] Bureau of Animal Industry Helminthological Collection, No. 2752.

[c] U. S. National Museum Helminthological Collection, Nos. 5956, 5988, 6003.

ANOMOTÆNIA MICROPHALLOS (Krabbe, 1869) Fuhrmann, 1908.

For description see KRABBE, 1869b, p. 266, pl. 2, figs. 35–37 (*Tænia microphallos*).—CLERC, 1903, pp. 336–337 (*Choanotænia microphallos*).

Hosts.—*Vanellus vanellus, Pisobia damacensis.*

ANOMOTÆNIA MICRORHYNCHA (Krabbe, 1869) Cohn, 1900.

For description see KRABBE, 1869b, p. 266, pl. 2, figs. 38–40 (*Tænia microrhyncha*).—COHN, 1901b, pp. 403–405.

Hosts.—*Charadrius apricarius, Ægialitis hiaticula, Ægialitis dubia. Machetes pugnax.*

ANOMOTÆNIA MUTABILIS (Rudolphi, 1819) Fuhrmann, 1907.

For description see FUHRMANN, 1907b, pp. 517–518, figs. 3, 4.

Host.—*Crotophaga ani.*

ANOMOTÆNIA NYMPHÆA (Schrank, 1790) Fuhrmann, 1908.

For description see KRABBE, 1869b, pp. 264–266, pl. 2, figs. 30–34 (*Tænia nymphæa*).

Hosts.—*Numenius borealis, Numenius phæopus, Bartramia longicauda.*

ANOMOTÆNIA PLATYRHYNCHA (Krabbe, 1869) Cohn, 1900.

For description see KRABBE, 1869b, pp. 271–272, pl. 3, figs. 56–58 (*Tænia platyrhyncha*).—COHN, 1901b, pp. 400–403, pl. 34, fig. 80.

Hosts.—*Totanus totanus, Pisobia damacensis.*

ANOMOTÆNIA PYRIFORMIS (Wedl, 1856) Fuhrmann, 1908.

For description see KRABBE, 1869b, p. 264, pl. 2, figs. 28, 29 (*Tænia pyriformis*).

Host.—*Crex crex.*

ANOMOTÆNIA SLESVICENSIS (Krabbe, 1882) Fuhrmann, 1908.

For description see KRABBE, 1882a, p. 352, pl. 1, fig. 9 (*Tænia slesvicensis*).

Hosts.—*Gallinago gallinago, Scolopax rusticola.*

ANOMOTÆNIA SOCIABILIS, new name.[a]

For description see KRABBE, 1869b, p. 258, pl. 1, figs. 1–3 (*Tænia socialis*).

Host.—*Uria troile.*

ANOMOTÆNIA TORDÆ (Fabricius, 1780) Fuhrmann, 1908.

For description see KRABBE, 1869b, p. 259, pl. 1, figs. 4–6 (*Tænia armillaris*).

Hosts.—*Uria troile, Alca torda.*

ANOMOTÆNIA TRIGONOCEPHALA (Krabbe, 1869) Fuhrmann, 1908.

For description see KRABBE, 1869b, p. 339, pl. 10, figs. 284–286 (*Tænia trigonocephala*).

Host.—*Saxicola œnanthe.*

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[a] New name for *A. socialis* (Krabbe, 1869) Fuhrmann, 1908. *Tænia socialis* Krabbe, 1869 is a homonym of *Tænia socialis* Retzius, 1786.

ANOMOTÆNIA VARIABILIS[a] **(Rudolphi, 1802).**

For description see Krabbe, 1869b, pp. 267–268, pl. 2, figs. 44–46 (*Tænia variabilis*).—Clerc, 1903, pp. 321–323 (*Choanotænia variabilis*).

Hosts.—*Vanellus vanellus, Squatarola squatarola, Totanus totanus, Erolia ferruginea, Pelidna alpina, Gallinago gallinago, Philohela minor.*

Genus AMŒBOTÆNIA Cohn, 1899.

Generic diagnosis.—Dipylidiinæ: Rostellum with a single crown of hooks. Neck absent. Segments few (not over 30), much broader than long. Genital pores regularly alternate. Testicles rather numerous (12 or more), in posterior portion of segment. Uterus sac-like, fills entire medullary portion of gravid segment. Adults in birds.

Type-species.—*Amœbotænia sphenoides* (Railliet, 1892) Cohn, 1899.

AMŒBOTÆNIA BREVIS (Linstow, 1884) Fuhrmann, 1908.

For description see Linstow, 1884a, p. 143, figs. 33, 34 (*Tænia brevis*).

Hosts.—*Squatarola squatarola, Charadrius apricarius, Ægialitis hiaticula.*

***AMŒBOTÆNIA SPHENOIDES**[b] **(Railliet, 1892) Cohn, 1899.**

For description see Cohn 1901b, pp. 381–385, pl. 33, figs. 57–59 (*Amœbotænia cuneata*).

Host.—**Gallus gallus domesticus.*

Genus LIGA Weinland, 1857.

Fuhrmannia Parona, 1901 (type, *F. brasiliensis* Parona).

Generic diagnosis.—Dipylidiinæ: Rostellum armed with a double crown of hooks with long dorsal and short ventral root. Strobila with 12 to 16 segments. Genital pores regularly alternate; located

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[a] Frölich (1802a, pp. 86–87, pl. 2, figs. 23–25) described a species under the name of *Tænia stentorea* from *Tringa hypoleucos*, which Rudolphi (1819a, p. 498) considers identical with *Tænia variabilis*. The name *stentorea* should replace *variabilis* if it can be proved that Frölich's paper appeared prior to Rudolphi's paper of 1802, otherwise the species should continue to be known as *variabilis*.

[b] *Synonomy* —*Tænia cuneata* Linstow, 1872, not Batsch, 1786; *Tænia sphenoides* Railliet, 1892; *Dicranotænia cuneata* (Linstow, 1872) Railliet, 1893; *Dicranotænia sphenoides* (Railliet, 1892) Railliet, 1896; *Amœbotænia sphenoides* (Railliet, 1892) Cohn, 1899; *Amœbotænia cuneata* (Linstow, 1872) Cohn, 1901.

This species has been fully described by Cohn (1901b) under the erroneous name *Amœbotænia cuneata*. *Tænia cuneata* Linstow, 1872, is a homonym of *Tænia cuneata* Batsch, 1786; hence, under the International Code of Zoological Nomenclature, the name *cuneata* can not be used for the species described by Linstow in any generic combination whatsoever.

Amœbotænia sphenoides has been found in this country in Maryland and the District of Columbia (Bureau of Animal Industry Helminthological Collection Nos. 14521, 14713, 14746).

in the anterior third of the segment. Genital canals pass dorsal of excretory vessels and nerve. Testicles about 18 in number, located posterior of the female glands. Vas deferens much coiled, in the anterior portion of the segment, without vesicular enlargement. Ovary a simple sac, median, in anterior half of segment. Yolk gland a simple sac posterior of ovary. Uterus thin-walled, much lobulated, occupying most of the medullary portion of the gravid segment. Outer shell of the egg with a tubular prolongation at each pole terminating in a globular expansion. Adults in birds.

Type-species.—*Liga punctata*[a] (Weinland, 1856) Weinland, 1857= *Liga brasiliensis* (Parona, 1901) Ransom, 1909.

***LIGA BRASILIENSIS (Parona, 1901) Ransom, 1909.**

For description see FUHRMANN, 1907b, p. 521, fig. 12 (*Fuhrmannia brasiliensis*).—RANSOM, 1909, pp. 22–25, figs. 9–14 (the present paper).

Host.—**Colaptes auratus.*

Genus LEPTOTÆNIA Cohn, 1901.

Generic diagnosis.—Dipylidiinæ: Scolex relatively very large. Rostellum armed with a single crown of hooks with long dorsal root and short ventral root, and rather short blade. Neck absent. Segments few (12 to 15). Genital pores regularly alternate. Reproductive organs protogynous in development. Testicles rather numerous (12 to 15), lateral in position toward the pore side of segment. Cirrus pouch and cirrus very long. Uterus sac-like, fills entire gravid segment. Adults in birds.

Type-species.—*Leptotænia ischnorhyncha* (Lühe, 1898) Cohn, 1901.

Genus PARVIROSTRUM[b] Fuhrmann, 1907.

Generic diagnosis.—Dipylidiinæ: Strobila small, division into segments not well marked. Scolex large, rostellum small, armed with double crown of hooks. Genital pores irregularly alternate. Reproductive glands very small. Testicles in lateral portions of segment. Ovary and yolk gland toward pore side of segment. Uterus sac-like. Adults in birds.

Type-species.—*Parvirostrum reticulatum* Fuhrmann, 1908.

Genus CYCLUSTERA Fuhrmann, 1901.

Generic diagnosis.—Dipylidiinæ: Rostellum with double crown of hooks. Longitudinal musculature in three layers. Genital pores regu-

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[a] As *Liga punctata* is invalid (see p. 21), and *Liga brasiliensis* is the next available name, the latter is the correct designation of this species.

[b] This genus was first mentioned without description or designation of type by Fuhrmann in 1907 (1907a, p. 292), and was first described in 1908 (1908b, p. 60), *P. reticulatum* being the only species.

larly alternate. Genital canals pass between the longitudinal excretory vessels and open into a very muscular cloacal canal. Testicles numerous, scattered throughout the entire dorsal medullary portion of the segment. Ovary and yolk gland surrounded by a ring-like uterus with secondary branches. Eggs with two shells. Adults in birds.

Type-species.—*Tænia capito* Rudolphi, 1819.

*** CYCLUSTERA CAPITO**[a] (Rudolphi, 1819) Fuhrmann, 1901.

For description see Krabbe, 1869b, pp. 281–282, pl. 4, figs. 94, 95 (*Tænia capito*).

Host.—**Ajaia ajaja.*

Genus LATEROTÆNIA Fuhrmann, 1906.

Generic diagnosis.—Dipylidiinæ: Rostellum simple, armed with a double crown of hooks. Genital pores irregularly alternate. Genital canals pass dorsal of the ventral excretory vessel, and ventral of the dorsal excretory vessel and longitudinal nerve. Testicles numerous, in lateral portions of segment in the region of the longitudinal excretory vessels. Female glands toward the pore side of the segment in the lateral portion of the medullary parenchyma. Uterus sac-like. Eggs with two envelopes. Adults in birds.

Type-species.—*Laterotænia natteri* Fuhrmann, 1906 = *Laterotænia nattereri* Fuhrmann, 1908 (orthographic emendation).

Genus PROORCHIDA[b] Fuhrmann, 1907.

Generic diagnosis.—Dipylidiinæ: Scolex armed with a double crown of hooks. Genital pores unilateral. Testicles in front of the female glands. Uterus much lobulated (?). Adults in birds.

Type-species.—*Proorchida lobata* Fuhrmann, 1908.

Genus CYCLORCHIDA Fuhrmann, 1907.

Generic diagnosis.—Dipylidiinæ: Rostellum armed with a double crown of hooks, which have a very large dorsal root and small hook portion. Genital pores unilateral. Genital canals pass between the longitudinal excretory vessels. Cirrus pouch communicating with the genital cloaca by a narrow canal opening upon a large papilla. Testicles very numerous, entirely surrounding the female genital glands. Uterus ventral, growing laterally between the excretory vessels into the cortical parenchyma. Adults in birds.

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[a] This species, originally described by Rudolphi on the basis of specimens collected in Brazil, has been found in the same host, *Ajaia ajaja* (Bureau of Animal Industry, Helminthological Collection No. 4164), in this country, at the National Zoological Park, Washington, D. C., where the bird had been brought from Texas. Fuhrmann (1908a, p. 138), probably through error, lists *C. capito* in *Platalea leucerodia*, but not in *Ajaia ajaja*.

[b] This genus was first mentioned by Fuhrmann in 1907 (1907a, p. 292), but was not described nor was the type designated until 1908 (1908b, p. 59).

Type-species.—*Cyclorchida omalancristrota* (Wedl, 1856) Fuhrmann, 1907.

Genus GRYPORHYNCHUS[a] Nordmann, 1832.

Acanthocirrus FUHRMANN, 1907 (type, *A. macrorostratus* FUHRMANN, 1907).

Generic diagnosis.—Dipylidiinæ: Rostellum armed. Genital pores unilateral. Genital canals pass between the longitudinal excretory vessels. Root of cirrus with one or two pairs of powerful spines lying in special pockets. Testicles few (6 to 8). Uterus sac-like. Adults in birds.

Type-species.—*Gryporhynchus pusillus* Nordmann, 1832 = larva of *Acanthocirrus macropeos* (Wedl, 1856).

GRYPORHYNCHUS PUSILLUS Nordmann, 1832.

For description see KRABBE, 1869b, p. 279, fig. 84 (*Tænia macropeos* Wedl).

Host.—*Nycticorax nycticorax.*

GRYPORHYNCHUS CHEILANCRISTROTUS (Wedl, 1856).

For description see CLERC, 1906b, pp. 716–718, figs. 7-11 (*Dilepis macropeos*).[b]

Host.—*Ardea cinerea.*

GRYPORHYNCHUS MACROROSTRATUS (Fuhrmann, 1907).

For description see FUHRMANN, 1907b, pp. 527–528, figs. 24-27 (*Acanthocirrus macrorostratus*).

Host.—*Anthus pratensis.*

Genus ANGULARIA Clerc, 1906.

Generic diagnosis.—Dipylidiinæ: Rostellum armed with a zigzag crown of numerous hooks (about 50). Genital pores irregularly

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[a] *Acanthocirrus*, described by Fuhrmann (1907b) for the two species *A. macrorostratus* (designated as type by Fuhrmann, 1908a, p. 63) and *Dilepis macropeos* (Wedl) of Clerc, 1906 falls into synonymy. Fuhrmann (1908a, p. 63) lists the following species in *Acanthocirrus: A. macrorostratus*, *A. cheilancristrota* (Wedl, 1856)=*Dilepis macropeos* (Wedl) of Clerc, and *A. macropeos* (Wedl, 1856). Krabbe (1869b, p. 279) who examined Wedl's original specimens of *Tænia macropeos*, states that in the shape and size of the hooks they correspond so exactly to *Gryporhynchus pusillus* that the latter must be considered the larval form of *Tænia macropeos*. Now as *Gryporhynchus pusillus* described in 1832 by Nordmann is the only original and hence type-species of *Gryporhynchus*, this generic name takes precedence over any later genus in which its type may be placed. Accordingly the placing of *Tænia macropeos* Wedl=*Gryporhynchus pusillus* in *Acanthocirrus* necessitates the dropping of the name *Acanthocirrus*.

[b] The form which Clerc describes and figures under the name *Dilepis macropeos*, according to Fuhrmann (1908a, p. 63), is in reality the species *Tænia cheilancristrota* Wedl, 1856.

alternate. Genital canals pass dorsal of the longitudinal excretory vessels. Vas deferens coiled, seminal vesicle absent. Testicles 20 to 25 in the posterior portion of the segment. Uterus with very irregular lobulations. Adults in birds.

Type-species.—*Angularia beema* Clerc, 1906.

ANGULARIA BEEMA Clerc, 1906.

For description see CLERC, 1906b, pp. 728–730, figs. 27–31.

Host.—*Riparia riparia.*

Genus CATENOTÆNIA[a] Janicki, 1904.

Cladotænia COHN, 1901 (in part).

Generic diagnosis.—Dipylidiinæ: Scolex unarmed, without rostellum. Segments considerably longer than broad. A single set of reproductive organs in each segment. Genital pores irregularly alternate. Genital canals pass dorsal of longitudinal excretory vessels and nerve. Testicles numerous, in posterior portion of segment. Female glands in anterior portion. Uterus consists of a median stem and lateral branches. Adults in mammals.

Type-species.—*Catenotænia pusilla* (Goeze, 1782) Janicki, 1904.

Genus DIPYLIDIUM Leuckart, 1863.

Generic diagnosis.—Dipylidiinæ: Rostellum armed with several rings of rose-thorn hooklets, which usually have a discoidal base. Suckers unarmed. Gravid segments generally longer than broad. A double set of reproductive organs in each segment. Genital pores double and opposite. Testicles very numerous, scattered throughout entire medullary parenchyma. Vas deferens coiled, seminal vesicle absent. Uterus at first reticular, later breaking up into egg capsules, each containing one or more eggs. Eggs with two shells. Adults in mammals and birds.

Type-species.—*Dipylidium caninum* (Linnæus, 1758).

Genus OOCHORISTICA Lühe, 1898.

Generic diagnosis.—Dipylidiinæ: Scolex unarmed, without rostellum. A single set of reproductive organs in each segment. Genital pores irregularly alternate. Testicles numerous, surround female glands posteriorly and on the sides. Vas deferens coiled, seminal vesicle absent. Uterus breaks down early and the eggs become inclosed singly in egg capsules. Adults in mammals and reptiles.

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[a] Fuhrmann (1907a, p. 293) would suppress this generic name in favor of *Cladotænia* Cohn, 1901, type-species, *Tænia globifera* Batsch, 1786, a species which (see Fuhrmann, 1906a, p. 220) is considered sufficiently similar to *Tænia solium* to belong in the same genus, but, under the rules of nomenclature, if *Cladotænia globifera* is transferred to *Tænia*, the generic name *Cladotænia* becomes a synonym of *Tænia*, and can not be used as a separate genus so long as the species *globifera* remains in *Tænia*. Cohn (1901b, p. 380) definitely designated *Tænia globifera* as the type of *Cladotænia*, and hence no other species can be taken as the type of this genus. Accordingly, Fuhrmann's proposal to take *Tænia dendritica* Goeze (one of the species originally included both in *Cladotænia* Cohn and *Catenotænia* Janicki) as type of *Cladotænia* Cohn, and to suppress *Catenotænia* Janicki is entirely at variance with article 29 of the International Code of Nomenclature.

Type-species.—Oochoristica tuberculata (Rudolphi, 1819) Lühe, 1898.

Genus PANCERINA[a] Fuhrmann, 1899.

Panceria SONSINO, 1895 (not ANDRES, 1877, sponge).

Generic diagnosis.—Dipylidiinæ: Scolex unarmed, without rostellum. A double set of reproductive organs in each segment. Testicles numerous, in the lateral fields of the segment, absent from the median field. Uteri develop in the lateral fields of the segment but disappear early, the eggs becoming isolated in the parenchyma, situated mostly in the lateral fields, few in the median field. Adults in reptiles.

Type-species.—Pancerina varanii (Stossich, 1895) = *Panceria arenaria* Sonsino, 1895.

Subfamily PARUTERININÆ (emended name).

"*Paruterinæ*" FUHRMANN, 1907.

Subfamily diagnosis.—Hymenolepididæ: Scolex usually armed, rarely without rostellum. A single (double in *Stilesia*, provisionally placed in this subfamily) set of reproductive organs in each segment. Uterus simple or double with a single para-uterine organ or multiple with several para-uterine organs, into which the eggs pass in the final stage of development of the segment. Adults in birds and amphibia (*Stilesia* in mammals).

Type-genus.—Paruterina Fuhrmann, 1906.

Genus PARUTERINA Fuhrmann, 1906.

Generic diagnosis.—Paruterininæ: Rostellum simple, armed with a double crown of hooks. Genital pores unilateral or irregularly alternate. Testicles (20 to 30) surrounding the female glands behind and at the sides. In front of the uterus a longitudinally elongated parenchymatous organ develops into which the eggs pass after the gravid segments become separated from the strobila. Adults in birds.

Type-species.—Paruterina candelabraria (Goeze, 1782) Fuhrmann, 1906.

PARUTERINA CANDELABRARIA (Goeze, 1782) Fuhrmann, 1906.

For description see KRABBE 1869b, p. 333, pl. 10, fig. 265 (*Tænia candelabraria*).—WOLFFHÜGEL, 1900a, pp. 153–164, figs. 85, 87–96 (*Tænia candelabraria*).

Host.—Asio flammeus.

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[a] Fuhrmann (1899f, p. 627; 1901a, p. 758) refers to this genus by this name, which may well be adopted in view of the fact that *Panceria* Sonsino, 1895, is a homonym of at least one earlier genus.

Genus CULCITELLA Fuhrmann, 1906.

Generic diagnosis.—Paruterininæ: Scolex with simple rostellum, armed with a double crown of hooks. Genital pores unilateral or irregularly alternating. Genital canals pass between the longitudinal excretory vessels. Testicles numerous, in a group behind the female glands, in some cases also extending forward along the sides of the latter. A transversely elongated parenchymatous mass or parauterine organ into which, probably, the eggs finally pass, develops in front of the sac-like transversely elongated uterus. On the pore side of the segment the large usually ventral longitudinal excretory vessel is dorsal in position and the narrow usually dorsal vessel ventral, the position being normal on the other side. Adults in birds.

Type-species.—*Culcitella rapacicola* Fuhrmann, 1906.

Genus RHABDOMETRA Kholodkovski, 1906.

Generic diagnosis.—Paruterininæ: Scolex unarmed, without rostellum. Genital pores irregularly alternate. Testicles (12 to 30 or more) in posterior portion of segment, in a group behind and extending forward along the sides of the female glands. Genital canals pass between the longitudinal excretory vessels. Uterus tubular and elongated longitudinally, or globular, occupying the median line of the segment. A para-uterine organ develops in front of the uterus and extends forward nearly to the anterior border of the segment. Adults in birds.

Type-species.—*Rhabdometra tomica* Kholodkovski, 1906.

RHABDOMETRA NIGROPUNCTATA (Crety, 1890) Fuhrmann, 1908.

For description see Crety, 1890d, pp. 8–10, figs. 1–3 (*Tænia nigropunctata*).—Stiles, 1896f, p. 59, pl. 20, figs. 268–270 (*T. nigropunctata*).

Host.—*Coturnix coturnix.*

*** RHABDOMETRA NULLICOLLIS Ransom, 1909.**

For description see Ransom, 1909, pp. 25–30, figs. 15–22 (the present paper).

Hosts.—**Centrocercus urophasianus*, **Pedioecetes phasianellus columbianus.*

*** RHABDOMETRA SIMILIS, Ransom, 1909.**

For description see Ransom, 1909, pp. 30–34, figs. 23–26 (the present paper).

Host.—**Coccyzus americanus.*

Genus ANONCHOTÆNIA Cohn, 1900.

Anürina Fuhrmann, 1901.
Amerina Fuhrmann, 1901.

Generic diagnosis.—Paruterininæ: Scolex unarmed, without rostellum. Genital pores irregularly (typical) or regularly alternate. Genital canals pass ventral of longitudinal excretory vessels and nerve. Testicles few (5 to 10) or more numerous (15 or more), dorsal of female glands and toward anterior border of segment. Ovary and yolk gland, small, ovoid in shape, in middle of segment. Uterus simple, sac-like, median, or displaced toward side of segment opposite genital pore, its antero-posterior axis assuming a diagonal and sometimes a transverse position. In front of or lateral of uterus a para-uterine organ develops into which the eggs finally pass. Adults in birds.

Type-species.—*Anonchotænia clava*[a] Cohn, 1900 = *Anonchotænia globata* (Linstow, 1879).

***ANONCHOTÆNIA GLOBATA (Linstow, 1879) Fuhrmann, 1908.**

For description see Cohn, 1901b, pp. 392–399, pl. 33, figs. 66–68; pl. 34, figs. 69–73 (*A. clava*).—Cerruti, 1901a, pp. 1–6, figs. 1–11 (*Amerina alaudæ*).—Fuhrmann, 1908c, pp. 623–626, figs. 1–71.—Ransom, 1909, pp. 34–36, fig. 27 (the present paper).

Hosts.—*Alauda arvensis*, **Dendroica striata*, ** Melospiza melodia*, *Passer domesticus*, *Passer montanus*, *Ægiothus linaria*, *Loxia curvirostra.*

ANONCHOTÆNIA LONGIOVATA (Fuhrmann, 1901) Fuhrmann, 1908.

For description see Fuhrmann, 1908c, pp. 627–629, figs. 8–11.

Host.—*?Plegadis guarauna.*

ANONCHOTÆNIA MACROCEPHALA Fuhrmann, 1908.

For description see Fuhrmann, 1908c, p. 629, fig. 13.

Host.—*Progne subis.*

ANONCHOTÆNIA, species.

Mentioned by Fuhrmann, 1908a, p. 188; 1908c, p. 631.
Host.—*Tyrannus melancholicus.*

Genus METROLIASTHES Ransom, 1900.

Generic diagnosis.—Paruterininæ: Scolex unarmed, without rostellum. Genital pores irregularly alternate. Genital canals pass between dorsal and ventral longitudinal excretory vessels and dorsal of the nerve. Testicles rather numerous (20 to 40), in posterior portion of segment. Uterus single in origin and consisting, when fully developed, of two spherical sacs touching in the median line and more or less fused with one another. A para-uterine organ, developing in front of the uterus, and into which the eggs pass, becomes transformed finally into a spherical egg capsule. Adults in birds.

Type-species.—*Metroliasthes lucida* Ransom, 1900.

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[a] Fuhrmann (1908a, p. 70; 1908c, p. 623) has shown that *Anonchotænia clava* is identical with *Tænia globata* Linstow, 1879, hence *Anonchotænia globata* is the correct name of this species.

*** METROLIASTHES LUCIDA Ransom, 1900.**

For description see RANSOM, 1900a, pp. 213–226, pl. 13, 14; 1905b, pp. 273–274, figs. 2, 9, 21, 27.

Hosts.—* *Meleagris gallopavo domestica*, * *Gallus gallus domesticus?*[a]

Genus BIUTERINA Fuhrmann, 1902.

Generic diagnosis.—Paruterininæ: Rostellum armed with a double crown of hooks triangular in shape, i. e., with short dorsal and ventral roots. Genital pores irregularly alternate. Genital canals pass between the longitudinal excretory vessels. Uterus single in origin becomes more or less completely divided into two parts in front of which a para-uterine organ develops. The latter is transformed into an egg capsule after the passage of the eggs into it from the uteri. Eggs with two envelopes. Adults in birds.

Type-species.—*Biuterina paradisea* Fuhrmann, 1902 = *Biuterina clavulus*[b] (Linstow, 1888).

BIUTERINA LONGICEPS (Rudolphi, 1819) Fuhrmann, 1908.

For description see KRABBE, 1869b, pp. 337–338, pl. 10, figs. 277, 278 (*Tænia longiceps*).—FUHRMANN, 1908d, pp. 424–425, figs. 22, 23.

Host.—*? Cairina moschata.*

BIUTERINA PASSERINA Fuhrmann, 1908.

For description see CLERC, 1906b, pp. 721–722, figs. 19, 20 (*Biuterina meropina*).—FUHRMANN, 1908d, pp, 426–428, figs. 28–31.

Host.—*Alauda arvensis.*

BIUTERINA TRAPEZOIDES Fuhrmann, 1908.

For description see FUHRMANN, 1908d, pp. 420–421, figs. 12–14.

Host.—*Molothrus ater.*

Genus NEMATOTÆNIA Lühe, 1899.

Generic diagnosis.—Paruterininæ: Scolex unarmed, without rostellum. Segmentation of strobila distinct only at the posterior end. Strobila circular in cross section. Genital pores alternate. Genital canals pass dorsal of the longitudinal excretory vessels and nerve. Uterus horseshoe-shaped, disappears early. Eggs through the action of numerous para-uterine organs become inclosed in egg capsules, 3 or 4 in each capsule. Adults in amphibia.

Type-species.—*Tænia dispar* Goeze, 1782.

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[a] A specimen in the collection of the Bureau of Animal Industry is recorded as collected from a chicken, but it is very probable that a mistake in labeling has been made in this case.

[b] Fuhrmann (1908a, p. 68; 1908d, p. 414) has found that *Biuterina paradisea* is identical with *Tænia clavulus* Linstow, 1888. Hence, the correct name of this species is *Biuterina clavulus.*

Genus STILESIA Railliet, 1893.

Generic diagnosis.—(?) Paruterininæ: Head unarmed, without rostellum. Neck present. Segments broader than long. A double set of reproductive organs in each segment, with opposite pores, or with irregularly alternating pores, those of one side, with the corresponding cirrus pouch, vagina and ovary having been suppressed, both of which conditions may occur in the same strobila. Genital canals pass between the longitudinal excretory vessels and dorsal of the nerve. Dorsal excretory vessel a considerable distance mediad from the ventral vessel. Testicles relatively few (6 to 12 in each set) in the lateral portions of the segment in the neighborhood of the longitudinal excretory vessels. Ovary small, globose, between the dorsal and ventral excretory vessel on pore side of segment. Yolk gland not apparent. Uterus small, spherical, sac-like, one in each lateral half of the segment between the dorsal and ventral excretory vessels. When the ovary is absent from one side, eggs from the opposite side of the segment appear to pass across through the median field in a manner not understood and enter the uterus of the side in which the ovary is lacking. Immediately anterior and mediad of each uterus a para-uterine organ develops into which the eggs probably pass. Eggs with two envelopes. Adults in mammals (ruminants).

Type-species.—*Stilesia globipunctata* (Rivolta, 1874) Railliet, 1893.

Subfamily HYMENOLEPIDINÆ (emended name).

Hymenolepinæ PERRIER, 1897.

Family diagnosis.—Hymenolepididæ: Rostellum armed with a single crown of hooks, or more rarely rudimentary and unarmed. Segments always broader than long. Longitudinal muscles in two layers. A single set of reproductive organs in each segment. Genital pores unilateral. Genital canals pass on the dorsal side of the longitudinal excretory vessels and nerve. Testicles one to four. Vas deferens always short with seminal vesicle. Uterus persistent, sac-like. Egg with three transparent shells. Adults in mammals and birds.

Type-genus.—*Hymenolepis* Weinland, 1858.

Genus OLIGORCHIS Fuhrmann, 1906.

Generic diagnosis.—Hymenolepidinæ: Rostellum armed with a single crown of hooks, four testicles in each segment. Seminal vesicle and seminal receptacle large. Adults in birds.

Type-species.—*Oligorchis strangulatus* FUHRMANN, 1906.

OLIGORCHIS STRANGULATUS Fuhrmann, 1906.

For description see FUHRMANN, 1906a, pp. 217–218, figs. 26–30.

Host.—*Elanoides forficatus.*

Genus HYMENOLEPIS Weinland, 1858.

Diplacanthus Weinland, 1858 (not Agassiz 1842, fish).
Lepidotrias Weinland, 1858.
Drepanidotænia Railliet, 1892.
Dicranotænia Railliet, 1892.
Echinocotyle Blanchard, 1891.
Triorchis Clerc, 1903 (1903, p. 286).

Generic diagnosis.—Hymenolepidinæ: Rostellum generally well developed and armed with a single crown of hooks, or more rarely rudimentary and unarmed. Suckers in adult rarely armed with hooklets or fine spines; are generally unarmed. Testicles three in each segment. Vas deferens with internal (i. e., inside the cirrus pouch) as well as external seminal vesicle (outside the cirrus pouch). Sacculus accessorius generally absent. Adults in mammals and birds.

Type-species.—*Hymenolepis flavopunctata* Weinland, 1858 = *Hymenolepis diminuta* (Rudolphi, 1819) Blanchard, 1891.

Subgenus HYMENOLEPIS Weinland, 1858.

Subgeneric diagnosis.—*Hymenolepis:* Rostellum generally well developed and armed with a single crown of hooks, or more rarely rudimentary and unarmed. Suckers in adult generally unarmed, or, rarely, their entire surface may be covered with minute spines. Sacculus accessorius generally absent. Adults in mammals and birds.

Type-species.—*Hymenolepis flavopunctata* Weinland, 1858 = *Hymenolepis diminuta* (Rudolphi, 1819) Blanchard, 1891.

HYMENOLEPIS ABORTIVA Linstow, 1904.

For description see Linstow, 1904m, pp. 382–383, figs. 7–10 (*Tænia* (*Hymenolepis*) *voluta*).[a]

Host.—*Anas platyrhynchos.*

HYMENOLEPIS ÆQUABILIS (Rudolphi, 1810) Cohn, 1901.

For description see Krabbe, 1869b, pp. 316–317, pl. 8, figs. 212, 213 (*Tænia æquabilis*).—Stiles, 1896f, pp. 33–34, pl. 3, figs. 29, 30 (*Dicranotænia æquabilis*).—Clerc, 1903, pp. 290–293, pl. 8, figs. 2, 16, 24 (*Drepanidotænia æquabilis*).

Hosts.—*Marila marila*, *Cygnus olor*, *Cygnus olor domesticus*, *Olor cygnus.*

HYMENOLEPIS AMPHITRICHA (Rudolphi, 1819) Fuhrmann, 1906.

For description see Krabbe, 1869b, pp. 311–312, pl. 8, figs. 195–197 (*Tænia amphitricha*).—Clerc, 1903, pp. 293–295, pl. 8, fig. 21 (*Drepanidotænia amphitricha*).

Hosts.—*Totanus totanus*, *Pelidna alpina*, *Arquatella maritima*, *Scolopax rusticola.*

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[a] Corrected to *Tænia* (*Hymenolepis*) *abortiva*, Centralbl. f. Bak., vol. 36, p. 592.

HYMENOLEPIS ANATINA (Krabbe, 1869) Cohn, 1901.

For description see KRABBE, 1869b, pp. 287–288, pl. 6, figs. 114–116 (*Tænia anatina*).—SCHMIDT, 1894a, pp. 65–112, pl. 6 (*Tænia anatina*).—STILES, 1896f, pp. 39–40, pl. 9, figs. 100–111; pl. 10, figs. 112–115 (*Drepanidotænia anatina*).—COHN, 1901b, pp. 322–323.

Hosts.—Spatula clypeata, Dafila acuta, Chaulelasmus streperus, Anas platyrhynchos, Anas platyrhynchos domestica, Cygnus olor domesticus, Fulica atra.

HYMENOLEPIS ARCUATA Kowalewski, 1904.

For description see KOWALEWSKI, 1905a, pp. 3-9, pl. 7, figs. 1–9; 1905b, pp. 532–533, pl. 14, figs. 1-9.

Host.—Marila marila.

HYMENOLEPIS ARDEÆ[a] Fuhrmann, 1906.

For description see FUHRMANN, 1906b, pp. 451–452, figs. 37–39.

Host.—Butorides virescens.

HYMENOLEPIS BASCHKIRIENSIS (Clerc, 1902) Fuhrmann, 1906.

For description see CLERC, 1903, pp. 288-290 (*Drepanidotænia baschkiriensis*).

Host.—Larus canus.

HYMENOLEPIS BISACCATA Fuhrmann, 1906.

For description see FUHRMANN, 1906b, pp. 444–445, figs. 21–24.

Host.—Cairina moschata.

HYMENOLEPIS BRACHYCEPHALA (Creplin, 1829).

For description see KRABBE, 1869b, pp. 294–295, pl. 6, figs. 136–140 (*Tænia brachycephala*).—COHN, 1901b, pp. 280–284, pl. 29, figs. 13, 14.

Host.—Machetes pugnax.

HYMENOLEPIS BRASILIENSIS Fuhrmann, 1906.

For description see FUHRMANN, 1906b, p. 446, fig. 26.

Host.—Antrostomus carolinensis.

*** HYMENOLEPIS CANTANIANA (Polonio, 1860) Ransom, 1909.**

For description see RANSOM, 1909, pp. 36–41, figs. 28, 29 (the present paper).

*Hosts.—Meleagris gallopavo domestica, *Pavo cristatus, *Gallus gallus domesticus, Phasianus colchicus.*

HYMENOLEPIS CAPILLARIS (Rudolphi, 1810) Fuhrmann, 1906.

For description see KRABBE, 1869b, p. 307, pl. 7, fig. 179 (*Tænia capillaris*).

Hosts.—Gavia stellata, Gavia arctica, Gavia immer, Colymbus auritus.

HYMENOLEPIS CAPILLAROIDES Fuhrmann, 1906.

For description see FUHRMANN, 1906b, pp. 355–356, figs. 6, 7.

Host.—Colymbus dominicus.

*** HYMENOLEPIS CARIOCA (Magalhaes, 1898) Ransom, 1902.**

For description see RANSOM, 1902a, pp. 151–158, pl. 23, figs. 1–7; pl. 24, figs. 8–10: 1905b, pp. 274–276, figs. 3, 10, 22, 28.

*Host.—*Gallus gallus domesticus.*

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[a] See discussion under *Dilepis unilateralis* (p. 72).

HYMENOLEPIS CLANDESTINA (Creplin in Krabbe, 1869) Cohn, 1904.

For description see Krabbe, 1869b, p. 316, pl. 8, figs. 208, 209 (*Tænia clandestina*).—Cohn, 1904, pp. 243–246, pl. 11, figs. 9–12.

Host.—Hæmatopus ostralegus.

HYMENOLEPIS COLLARIS (Batsch, 1786) Fuhrmann, 1908.

For description see Krabbe, 1869b, pp. 298–299, pl. 7, figs. 151–153 (*Tænia sinuosa*).—Stiles, 1896f, pp. 40–41, pl. 10, figs. 116–124; pl. 11, figs. 125–139; pl. 12, figs. 140–146; pl. 13, fig. 153 (*Drepanidotænia sinuosa*).—Cohn, 1901b, pp. 323–325 (*Hymenolepis sinuosa*).

Hosts.—Dafila acuta, Mareca penelope, Anas platyrhynchos, Anas platyrhynchos domestica, Anser anser, Anser anser domesticus.

HYMENOLEPIS COMPRESSA (Linton, 1892) Fuhrmann, 1906.

For description see Linton, 1892l, pp. 108–110, pl. 8, figs. 83–92 (*Tænia compressa*).—Kowalewski, 1907, p. 775, pl. 23, figs. 7–11; 1908, pp. 638–641; pl. 20, figs. 7–11.

Hosts.—Oidemia americana, Aristonetta valisineria, Marila marila.

HYMENOLEPIS CORONULA (Dujardin, 1845) Cohn, 1901.

For description see Krabbe, 1869b, pp. 317–318, pl. 8, figs. 216–219 (*Tænia coronula*).—Stiles, 1896f, p. 33, pl. 3, figs. 21–28 (*Dicranotænia coronula*).—Wolffhügel, 1900a, pp. 165–175, figs. 97–105 (*Dicranotænia coronula*).—Linstow, 1905dd, p. 5, pl. 1, figs. 16–18 (*H. megalhystera*).

Hosts.—Harelda hyemalis, Clangula clangula, Marila marila, Mareca penelope, Anas platyrhynchos, Anas platyrhynchos domestica, Anser anser.

HYMENOLEPIS CREPLINI (Krabbe, 1869).

For description see Krabbe, 1869b, p. 317, pl. 8, figs. 214, 215, (*Tænia creplini*).—Cohn, 1901b, pp. 304–307, pl. 30, figs. 31–33.

Hosts.—Anser anser, Anser albifrons, Cygnus olor, Olor cygnus.

HYMENOLEPIS ECHINOCOTYLE Fuhrmann, 1907.

For description see Fuhrmann, 1907b, pp. 532–533, figs. 37, 38.

Host.—Spatula clypeata.

HYMENOLEPIS EXILIS[a] (Dujardin, 1845) Fuhrmann, 1906.

For description see Dujardin, 1845a, p. 602 (*Tænia exilis*).—Stiles, 1896f, p. 58 (*Tænia exilis*).

Host.—Gallus gallus domesticus.

HYMENOLEPIS FALLAX (Krabbe, 1869) Cohn, 1901.

For description see Krabbe, 1869b, p. 319, pl. 8, figs. 221, 222 (*Tænia fallax*).

Hosts.—Somateria mollissima, Marila marila, Mareca penelope.

HYMENOLEPIS FARCIMINOSA (Goeze, 1782).

For description see Krabbe, 1869b, pp. 321–322, pl. 9, figs. 230–232 (*Tænia farciminalis*).—Volz, 1900, pp. 32–35, pl. 2, fig. 10 (*Diplacanthus farciminalis*

Host.—Sturnus vulgaris.

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[a] This species is perhaps identical with *Hymenolepis carioca*, but the original description is so incomplete that this question can not be settled.

HYMENOLEPIS FASCICULATA, new name.[a]

For description see KRABBE, 1869b, p. 300, pl. 7, figs. 156, 157 (*Tænia fasciata*).—STILES, 1896f, pp. 37–38, pl. 5, figs. 56–66; pl. 6, figs. 67–76; pl. 7, figs. 77–79 (*Drepanidotænia fasciata*).—COHN, 1901b, p. 329.—CLERC, 1903, p. 307 (*Drepanidotænia fasciata*).

Hosts.—Mareca penelope, Anser anser, Anser anser domesticus, Anser albifrons.

HYMENOLEPIS FRAGILIS (Krabbe, 1869) Fuhrmann, 1906.

For description see KRABBE, 1869b, pp. 300–301, pl. 7, figs. 158–160 (*Tænia fragilis*).—FUHRMANN, 1906b, pp. 747–748, figs. 11–12.

Hosts.—Nettion crecca, Chaulelasmus streperus.

HYMENOLEPIS PASSERIS (Gmelin, 1790).

For description see KRABBE, 1869b, pp. 326–327, pl. 9, figs. 245–247 (*Tænia fringillarum*).

Hosts.—Passer domesticus, Passer montanus, Ægiothus linaria.

HYMENOLEPIS FURCIFERA (Krabbe, 1869).

For description see KRABBE, 1869b, p. 306, pl. 7, figs. 176–178 (*Tænia furcifera*).—SZYMANSKI, 1904a, p. 344, pl. 8, figs. 6, 7 (*Tænia furcifera*); 1905b, p. 734, pl. 16, figs. 6, 7 (*Tænia furcifera*).—LINSTOW, 1908, pp. 38–39, figs. 1, 2.

Host.—Colymbus auritus.

HYMENOLEPIS FUSUS (Krabbe, 1869) Fuhrmann, 1906.

For description see KRABBE, 1869b, pp. 307–308, pl. 7, figs. 180, 181 (*Tænia fusus*).

Hosts.—Larus hyperboreus, Larus marinus.

HYMENOLEPIS GRACILIS (Zeder, 1803) Cohn, 1901.

For description see KRABBE, 1869b, p. 299, pl. 7, figs. 154, 155 (*Tænia gracilis*).—STILES, 1896f, pp. 38–39, pl. 7, figs. 80–91; pl. 8, figs. 92–99 (*Drepanidotænia gracilis*).—WOLFFHÜGEL, 1900a, pp. 176–183, figs. 106–109 (*Drep. gracilis*).—COHN, 1901b, pp. 327–329.—CLERC, 1903, pp. 305–306 (*Drep. gracilis*).

Hosts.—Mergus serrator, Marila marila, Spatula clypeata, Nettion crecca, Mareca penelope, Chaulelasmus streperus, Anas platyrhynchos, Anas platyrhynchos domestica, Anser anser domesticus.

HYMENOLEPIS GRŒNLANDICA (Krabbe, 1869) Fuhrmann, 1906.

For description see KRABBE, 1869b, p. 316, pl. 8, figs. 210, 211 (*Tænia grœnlandica*).

Host.—Harelda hyemalis.

HYMENOLEPIS HIMANTOPODIS (Krabbe, 1869) Fuhrmann, 1906.

For description see KRABBE, 1869b, pp. 309–310, pl. 8, fig. 190 (*Tænia himantopodis*).—FUHRMANN, 1906b, pp. 748–749, fig. 13.

Host.—Himantopus mexicanus.

HYMENOLEPIS INTERRUPTA (Rudolphi, 1802) Fuhrmann, 1906.

For description see FUHRMANN, 1906b, pp. 745–746, fig. 8.

Host.—Scolopax rusticola.

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[a] New name for *Tænia fasciata* Rudolphi of Krabbe, 1869. *Tænia fasciata* Rudolphi, 1810=*Tænia setigera* Frölich, 1789.

HYMENOLEPIS LANCEOLATA (Bloch, 1782) Weinland, 1858.

For description see STILES, 1896f, pp. 36–37, pl. 4, figs. 43–53; pl. 5, figs. 54, 55 (*Drepanidotænia lanceolata*).—CLERC, 1903, pp. 302–303, pl. 8, fig. 4 (*Drep. lanceolata*).—RANSOM, 1904d, pp. 14, 101–110, figs. 108–130.

Hosts.—Netta rufina, Cairina moschata, Anas rubripes, Anas platyrhynchos domestica, Branta bernicla, Anser anser, Anser anser domesticus, Olor cygnus.

HYMENOLEPIS LINEA (Goeze, 1782) Wolffhügel, 1899.

For description see KRABBE, 1869b, pp. 327–328, pl. 9, figs. 248, 249 (*Tænia linea*).—WOLFFHÜGEL, 1900a, pp. 189–190, pl. 7, fig. 112.

Host.—Coturnix coturnix.

HYMENOLEPIS LIOPHALLOS (Krabbe, 1869) Fuhrmann, 1906.

For description see KRABBE, 1869b, p. 291, pl. 6, fig. 122 (*Tænia liophallos*).

Host.—Olor cygnus.

HYMENOLEPIS LONGIVAGINATA Fuhrmann, 1906.

For description see FUHRMANN, 1906b, pp. 752–753, fig. 19.

Host.—Branta leucopsis.

HYMENOLEPIS MACRACANTHOS (Linstow, 1877) Fuhrmann, 1906.

For description see LINSTOW, 1877a, pp. 16–17, pl. 1, fig. 24 (*Tænia macracanthos*).

Host.—Clangula clangula.

*** HYMENOLEPIS MEGALOPS (Nitzsch in Creplin, 1829) Parona, 1899.**

For description see RANSOM, 1902a, pp. 158–167, pl. 24, figs. 11–14; pl. 25, figs. 15–20.

*Hosts.—Marila marila, Cairina moschata, Nettion crecca, *Dafila acuta, Anas platyrhynchos domestica, Olor cygnus.*

HYMENOLEPIS MELEAGRIS (Clerc, 1902) Fuhrmann, 1906.

For description see CLERC, 1902a, pp. 574–575 (*Drepanidotænia meleagris*); 1903, p. 306 (un Cestode dans *Meleagris gallopavo*).

Host.—Meleagris gallopavo domestica.

HYMENOLEPIS MICRANCRISTROTA (Wedl, 1856) Fuhrmann, 1906.

For description see KRABBE, 1869b, p. 318, pl. 8, fig. 220 (*Tænia micrancristrota*).

Host.—Olor cygnus.

HYMENOLEPIS MICROCEPHALA (Rudolphi, 1819) Fuhrmann, 1906.

For description see KRABBE, 1869b, p. 310, pl. 8, figs. 191, 192 (*Tænia microcephala*).—COHN, 1904, pp. 246–248, pl. 11, figs. 13–16 (*Tænia multiformis*).

Host.—Nycticorax nycticorax, Ardea cinerea, Plegadis autumnalis.

HYMENOLEPIS MICROPS (Diesing, 1850) Fuhrmann, 1906.

For description see WOLFFHÜGEL, 1900a, pp. 191–192, fig. 110 (*H. tetraonis*).

Host.—Centrocercus urophasianus?[a]

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[a] Leidy (1887a, p. 1) identified tapeworms from this host as *Tænia microps* Diesing, but according to Fuhrmann (1908a, p. 103) they are probably a species of *Davainea*.

HYMENOLEPIS MICROSOMA (Creplin, 1829) Cohn, 1901.

For description see KRABBE, 1869b, pp. 296–298, pl. 6, figs. 146–150 (*Tænia microsoma*).—COHN, 1901b, pp. 284–288, pl. 29, figs. 15–22.

Hosts.—Oidemia fusca, Somateria spectabilis, Somateria mollissima, Harelda hyemalis, Marila marila, ? Larus hyperboreus.

HYMENOLEPIS MINOR, new name.[a]

For description see KRABBE, 1869b, p. 292, pl. 6, figs. 127–129 (*Tænia minuta*).

Host.—Lobipes lobatus.

HYMENOLEPIS MUSCULOSA (Clerc, 1902) Fuhrmann, 1906.

For description see CLERC, 1903, pp. 303–305, pl. 8, figs. 17, 23; pl. 9, figs. 29, 35 (*Drepanidotænia musculosa*).

Host.—Meleagris gallopavo domestica.

HYMENOLEPIS OCTACANTHA (Krabbe, 1869) Fuhrmann, 1906, not Cohn, 1901.

For description see KRABBE, 1869b, p. 301, pl. 7, figs. 161, 162 (*Tænia octacantha*).—FUHRMANN, 1906b, pp. 746–747, figs. 9, 10.

Hosts.—Spatula clypeata, Nettion crecca, Dafila acuta, Chaulelasmus streperus, Anas platyrhynchos.

HYMENOLEPIS ORIENTALIS (Krabbe, 1879) Fuhrmann, 1906.

For description see KRABBE, 1879a, p. 11, figs. 50–52 (*Tænia orientalis*); 1882a, p. 360, pl. 2, figs. 43, 44 (*T. orientalis*).

Host.—Saxicola œnanthe.

HYMENOLEPIS PACHYCEPHALA (Linstow, 1872) Fuhrmann, 1906.

For description see LINSTOW, 1872d, p. 55, pl. 3, figs. 2–4 (*Tænia pachycephala*); 1904n, p. 305, pl. 13, figs. 17–20 (*Drepanidotænia pachycephala*).

Host.—Colymbus auritus, Histrionicus histrionicus.

HYMENOLEPIS PAPILLATA Fuhrmann, 1906.

For description see FUHRMANN, 1906b, pp. 357–358, figs. 10, 11.

Host.—Cairina moschata.

HYMENOLEPIS PARVULA Kowalewski, 1904.

For description see KOWALEWSKI, 1905a, pp. 9–16, pl. 7, figs. 10–17; 1905b, pp. 533–534, pl. 14, figs. 10–17.

Host.—Anas platyrhynchos domestica.

HYMENOLEPIS PHASIANINA Fuhrmann, 1907.

For description see FUHRMANN, 1907b, pp. 533–534, figs. 40, 41.

Host.—Phasianus colchicus.

HYMENOLEPIS PIGMENTATA (Linstow, 1872) Fuhrmann, 1906.

For description see LINSTOW, 1872d, p. 56, pl. 3, figs. 7, 8 (*Tænia pigmentata*).

Host.—Marila marila.

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[a] New name for *Tænia minuta* Krabbe, 1869, not *Tænia minuta* Braun in Rudolphi, 1810.

HYMENOLEPIS POCULIFERA (Linstow, 1879) Fuhrmann, 1906.

For description see Linstow, 1879a, pp. 186–187, pl. 12, figs. 37, 38 (*Tænia poculifera*).

Host.—Fulica atra.

HYMENOLEPIS PODICIPINA Szymanski, 1904.

For description see Szymanski, 1904a, pp. 342–344, pl. 8, figs. 1–5; 1905b, pp. 733–734, pl. 16, figs. 1–5.

Host.—Colymbus auritus.

HYMENOLEPIS RECTACANTHA Fuhrmann, 1906.

For description see Fuhrmann, 1906b, pp. 446–447, fig. 27.

Host.—Ægialitis hiaticula.

HYMENOLEPIS RETRACTA Linstow, 1905.

For description see Linstow, 1905dd, p. 4, pl. 1, fig. 15.

Host.—Somateria spectabilis.

HYMENOLEPIS ROSTELLATA (Abildgaard, 1790) Fuhrmann, 1908.

For description see Krabbe, 1869b, pp. 286–287, pl. 5, figs. 112, 113 (*Tænia capitellata*).—Fuhrmann, 1896k, pp. 443–449, pl. 14, figs. 5–10 (*Tænia capitellata*).

Hosts.—Gavia stellata, Gavia arctica, Gavia immer.

HYMENOLEPIS RUGOSA Clerc, 1906.

For description see Clerc, 1906a, pp. 433–434, figs. 1–4.

Host.—Columba livia.

HYMENOLEPIS SAGITTA (Rosseter, 1906) Fuhrmann, 1908.

For description see Rosseter, 1906b, pp. 275–278, 1 pl. (*Drepanidotænia sagitta*).

Host.—Anas platyrhynchos domestica.

HYMENOLEPIS SERPENTULUS (Schrank, 1788) Weinland, 1858.

For description see Volz, 1900, pp. 135–140, pl. 7, fig. 8 (*Diplacanthus serpentulus*).—Cohn, 1901b, pp. 294–297, pl. 29, figs. 23, 24; pl. 30, fig. 25, 1 text figure.—Clerc, 1903, pp. 295–296, pl. 8, fig. 8 (*Drepanidotænia serpentulus*).

Hosts.—?Planesticus migratorius, Pica pica, Corvus corax.

HYMENOLEPIS SETIGERA (Frölich, 1789) Cohn, 1901.

For description see Krabbe, 1869b, pp. 289–290, pl. 6, figs. 117–121 (*Tænia setigera*).—Stiles, 1896f, pp. 41–42, pl. 12, figs. 147–150; pl. 13, figs. 154–164 (*Drepanidotænia setigera*).—Clerc, 1903, pp. 298–302, pl. 8, figs. 3, 6, 7, 12, 22 (*Drepanidotænia setigera*).

Hosts.—Branta bernicla, Branta leucopsis, Anser anser, Anser fabalis, Cygnus olor domesticus, Olor cygnus.

HYMENOLEPIS SIBIRICA (Linstow, 1905) Fuhrmann, 1908.

For description see Linstow, 1905dd, pp. 6–7, pl. 1, fig. 22 (*Diorchis sibirica*).

Host.—Somateria spectabilis.

HYMENOLEPIS SPHÆROPHORA (Rudolphi, 1810) Fuhrmann, 1906.

For description see Rudolphi, 1810a, pp. 119–120 (*Tænia sphærophora*).—Cobbold, 1858b, p. 164, pl. 33, figs. 63–67 (*T. sphærophora*).

Hosts.—Gallinago gallinago, Scolopax rusticola.

HYMENOLEPIS COLUMBÆ (Zeder, 1800).

For description see FUHRMANN, 1906b, pp. 449–450, figs. 34, 35 (*H. sphenocephala*).

Host.—Columba livia domestica.

HYMENOLEPIS STYLOSA (Rudolphi, 1810) Volz, 1899.

For description see KRABBE, 1869b, p. 326, pl. 9, figs. 242–244 (*Tænia stylosa*).—VOLZ, 1900, pp. 141–144, pl. 7, fig. 9 (*Diplacanthus stylosus*).

Hosts.—Pica pica, Corvus corax.

HYMENOLEPIS TENERRIMA (Linstow, 1882) Fuhrmann, 1906.

For description see LINSTOW, 1882a, p. 21, pl. 2, fig. 26 (*Tænia tenerrima*).

Host.—Marila marila.

HYMENOLEPIS TENUIROSTRIS (Rudolphi, 1819) Cohn, 1901.

For description see KRABBE, 1869b, pp. 291–292. pl. 6, figs. 123–126 (*Tænia tenuirostris*).—STILES, 1896f, p. 43, pl. 14, figs. 165–172 (*Drepanidotænia tenuirostris*).—COHN, 1901b, pp. 326–327.

Hosts.—Mergus serrator, Mergellus albellus, Oidemia fusca, Somateria mollissima, Marila marila, Anas platyrhynchos domestica, Anser anser domesticus.

HYMENOLEPIS TERESOIDES Fuhrmann, 1906.

For description see FUHRMANN, 1906b, pp. 443–444, fig. 20.

Host.—Chaulelasmus streperus.

HYMENOLEPIS TRIFOLIUM Linstow, 1906.

For description see LINSTOW, 1905t, pp. 361–362, pl. 23, figs. 6, 7.

Host.—Anas platyrhynchos.

HYMENOLEPIS ULIGINOSA (Krabbe, 1882) Fuhrmann, 1906.

For description see KRABBE, 1882a, p. 355, pl. 1, figs. 25–27 (*Tænia uliginosa*).

Host.—Numenius phæopus.

HYMENOLEPIS VALLEI (Stossich, 1892) Fuhrmann, 1906.

For description see STOSSICH, 1892b, pp. 68–69, pl. 1, figs. 3, 4 (*Tænia vallei*).

Host.—?Pisobia damacensis.

HYMENOLEPIS VENUSTA (Rosseter, 1897).

For description see ROSSETER, 1898a, pp. 10–23, pls. 1, 2, figs. 1–17 (*Drepanidotænia venusta*).

Host.—Anas platyrhynchos domestica.

HYMENOLEPIS VILLOSA (Bloch, 1782) Wolffhügel, 1899.

For description see KRABBE, 1869b, pp. 303–304, pl. 7, figs. 168, 169 (*Tænia villosa*); 1882a, pp. 354–355, pl. 1, figs. 19–22 (*Tænia villosa*).—WOLFFHÜGEL, 1900a, pp. 184–188, pl. 7, fig. 11.

Host.—?Gallus gallus domesticus.

HYMENOLEPIS, species Cohn.

For description see COHN, 1901b, pp. 312–319, pl. 31, figs. 38, 39.

Host.—Marila marila.

Subgenus ECHINOCOTYLE Blanchard, 1891.

Subgeneric diagnosis.—Hymenolepis: Rostellum armed with a single crown of ten slender hooks with dorsal root and blade about equal in length and ventral root rudimentary. Suckers large, flat, armed on the borders and in the middle with small hooklets. A sacculus accessorius always present. Adults in birds.

Type-species.—Echinocotyle rosseteri Blanchard, 1891.

ECHINOCOTYLE NITIDA (Krabbe, 1869) Clerc, 1902.

For description see Krabbe, 1869b, p. 294, pl. 6, figs. 133–135 (*Tænia nitida*).—Clerc, 1903, pp. 310–315, pl. 9, figs. 26, 27, 30, 31, 36, 38, 40–42.

Hosts.—Limosa limosa, Pisobia damacensis, Pelidna alpina, Arquatella maritima, Gallinago gallinago.

ECHINOCOTYLE NITIDULANS (Krabbe, 1882) Fuhrmann, 1906.

For description see Krabbe, 1882a, p. 353, pl. 1, figs. 16, 17 (*Tænia nitidulans*).

Hosts.—Ægialitis hiaticula, Pelidna alpina.

ECHINOCOTYLE ROSSETERI Blanchard, 1891.

For description see Blanchard, 1891t, pp. 424–428, figs. 1–3.—Stiles, 1896f, pp. 55–56, pl. 19, figs. 247–251.

Host.—Anas platyrhynchos domestica.

Genus DIORCHIS Clerc, 1903.

Generic diagnosis.—Hymenolepidinæ: Rostellum with a single crown of ten hooks with long dorsal and short ventral roots or exceptionally with very short dorsal root and with ventral root nearly as long as the blade. Surface of suckers may be armed with minute spines. Inner longitudinal muscle layer consisting of 8 bundles, 4 dorsal and 4 ventral. Two testicles in each segment. Adults in birds.

Type-species.—Diorchis acuminata (Clerc, 1902) Clerc, 1903.

*** DIORCHIS ACUMINATA (Clerc, 1902) Clerc, 1903.**

For description see Clerc, 1903, pp. 281–284, pl. 9, fig. 25; pl. 11, figs. 78, 88.—Ransom, 1909, pp. 42–48, figs. 30–36 (the present paper).

*Hosts.—Nettion crecca, Mareca penelope, Chaulelasmus streperus, Fulica atra, *Fulica americana.*

*** DIORCHIS AMERICANA Ransom, 1909.**

For description see Ransom, 1909, pp. 48–51, figs. 37–42 (the present paper).

Host.— Fulica americana.*

DIORCHIS INFLATA (Rudolphi, 1819) Clerc, 1903.

For description see Krabbe, 1869b, pp. 285–286, pl. 5, figs. 109–111 (*Tænia inflata*).—Jacobi, 1898c, pp. 95–104, 1 pl. (*T. inflata*).—Cohn, 1901b, pp. 330–331 (*Hymenolepis inflata*).—Clerc, 1903, pp. 284–288, pl. 11, fig. 89.—Linstow, 1906, pp. 15–17, pl. 1, figs. 17, 18 (*H. inflata*).

Host.—Fulica atra.

DIORCHIS PARVICEPS (Linstow, 1872) Linstow, 1904.

For description see LINSTOW, 1872d, p. 57, pl. 3, figs. 11, 12 (*Tænia parviceps*); 1904n, pp. 306–307, pl. 13, figs. 23–25.

Host.—*Mergus serrator.*

Genus APLOPARAKSIS Clerc, 1903.

Monorchis CLERC, 1902 (type, *M. filum* (GOEZE, 1782); not *Monorchis*, Trematoda).
Skorikowia LINSTOW, 1905 (type, *S. clausa* LINSTOW, 1905=*Aploparaksis brachyphallos* (KRABBE). (See FUHRMANN, 1908a, p. 82).

Generic diagnosis.—Hymenolepidinæ: Strobila small and slender. Rostellum armed with a single crown of hooks, with ventral root as long or nearly as long as the blade. Suckers unarmed. One testicle, dorsal. Seminal vesicle large. Adults in birds.

Type-species.—*Aploparaksis filum* (Goeze, 1782) Clerc, 1903.

APLOPARAKSIS BIRULAI Linstow, 1905.

For description see LINSTOW, 1905dd, p. 8, pl. 2, figs. 26–28.

Host.—*Somateria spectabilis.*

APLOPARAKSIS BRACHYPHALLOS (Krabbe, 1869) Fuhrmann, 1908.

For description see KRABBE, 1869b, pp. 310–311, pl. 8, figs. 193, 194 (*Tænia brachyphallos*).

Hosts.—*Aegialitis hiaticula, Calidris leucophæa, Pisobia damacensis, Pelidna alpina, Arquatella maritima, Tringa canutus.*

APLOPARAKSIS CIRROSA (Krabbe, 1869) Clerc, 1903.

For description see KRABBE, 1869b, p. 308, pl. 7, figs. 182–185 (*Tænia cirrosa*).—CLERC, 1903, pp. 269–271, pl. 8, fig. 14.

Hosts.—*Larus canus, Larus minutus, Sterna hirundo.*

APLOPARAKSIS CRASSIROSTRIS (Krabbe, 1869) Clerc, 1903.

For description see KRABBE, 1869b, p. 314, pl. 8, figs. 202–204 (*Tænia crassirostris*).—CLERC, 1903, pp. 265–267, pl. 8, fig. 20.

Hosts.—*Hæmatopus ostralegus, Squatarola squatarola, Aegialitis hiaticula, Machetes pugnax, Pisobia damacensis, Pelidna alpina, Gallinago gallinago, Scolopax rusticola, Lobipes lobatus.*

APLOPARAKSIS DIMINUENS Linstow, 1905.

For description see LINSTOW, 1905dd, pp. 8–9, pl. 2, figs. 29–31.

Host.—*Phalaropus fulicarius.*

APLOPARAKSIS DUJARDINII (Krabbe, 1869) Clerc, 1903.

For description see KRABBE, 1869b, pp. 319–320, pl. 9, figs. 223–225 (*Tænia dujardinii*).—FUHRMANN, 1896k, pp. 436–442, pl. 14, figs. 1–4 (*Tænia dujardini*).—CLERC, 1903, pp. 274–275 (*A. dujardini*).

Hosts.—*Sturnus vulgaris, Turdus musicus.*

APLOPARAKSIS FILUM (Goeze, 1782) Clerc, 1903.

For description see KRABBE, 1869b, pp. 312–313, pl. 8, figs. 198–201 (*Tænia filum*).—CLERC, 1903, pp. 257–263, figs. 1, 2, pl. 8, figs. 11, 15.

Hosts.—*Arenaria interpres, Limosa limosa, Totanus totanus, Helodromas ochropus, Machetes pugnax, Pisobia damacensis, Pelidna alpina, Gallinago media, Gallinago gallinago, Scolopax rusticola, Lobipes lobatus.*

APLOPARAKSIS FURCIGERA (Rudolphi, 1819) Fuhrmann, 1908.

For description see KRABBE, 1869b, p. 315, pl. 8, figs. 205–207 (*Tænia rhomboidea*).—STILES, 1896f, pp. 34–35, pl. 3, figs. 31–34 (*Dicranotænia furcigera*)

Hosts.—Nettion crecca, Anas platyrhynchos.

APLOPARAKSIS PENETRANS (Clerc, 1902) Clerc, 1903.

For description see CLERC, 1903, pp. 271–274, pl. 8, figs. 10, 18, 19.—KOWALEWSKI, 1907, p. 774, pl. 23, figs. 1–6; 1908, pp. 633–638, pl. 20, figs. 1–6.

Hosts.—Pisobia damacensis, Gallinago gallinago.

APLOPARAKSIS PUBESCENS (Krabbe, 1882).

For description see KRABBE, 1882a, p. 355 (*Tænia pubescens*), pl. 1, figs. 23, 24, pl. 8, figs. 1, 5 (*T. hirsuta*).

Hosts.—Helodromas ochropus, Scolopax rusticola.

Family TÆNIIDÆ Ludwig, 1886.

Family diagnosis.—Tænioidea: Scolex usually with well developed rostellum armed with a double crown of hooks, rarely with rudimentary unarmed rostellum. Suckers unarmed. Gravid segments longer than broad. A single set of reproductive organs in each segment. Genital pores irregularly alternate. Vas deferens coiled, seminal vesicle absent. Testicles numerous, usually very numerous, scattered throughout the medullary parenchyma, except in the posterior median portion occupied by the double ovary, posterior of which is the yolk gland. Uterus with median stem, and when fully developed with lateral branches. Egg with a thin outer membrane, and a thick brown radially striated inner shell. Adults in mammals and birds.

Type-genus.—*Tænia* Linnæus, 1758.

Genus TÆNIA Linnæus, 1758.

Cladotænia[a] COHN, 1901 (type, *C. globifera* (BATSCH, 1786)=*Tænia cylindracea* BLOCH, 1782; see FUHRMANN, 1906a, p. 220; 1907a, p. 293; 1908a, p. 84).

Generic diagnosis.—Tæniidæ: With the characters of the family. Adults in mammals and birds.

Type-species.—*Tænia solium* Linnæus, 1758.

TÆNIA CYLINDRACEA Bloch, 1782.

For description see MORELL, 1895b, pp. 87–92, pl. 7, figs. 5–7 (*T. globifera*).—VOLZ, 1900, pp. 157–160, pl. 8, fig. 14 (*T. globifera*); pp. 161–163, pl. 8, figs. 15, 16 (*T. armigera*).—COHN, 1901b, pp. 373–380, pl. 32, figs. 51–53; pl. 33, figs. 55, 56 (*Cladotænia globifera*).

Hosts.—Cerchneis tinnunculus, Falco æsalon, Falco peregrinus, Haliæetus albicilla.

TÆNIA CONSCRIPTA Railliet and Henry, 1909.

For description see KOWALEWSKI, 1895a, p. 359, pl. 8, fig. 27 (*Tænia krabbei*).—STILES, 1896f, pp. 42–43, pl. 12, figs. 151, 152 (*Tænia krabbei*).

Host.—Anser anser domesticus.

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[a] For earlier synonyms of *Tænia*, see Stiles, 1906a, p. 36.

HYMENOLEPIS ANATINA (Krabbe, 1869) Cohn, 1901.

For description see Krabbe, 1869b, pp. 287–288, pl. 6, figs. 114–116 (_Tænia anatina_).—Schmidt, 1894a, pp. 65–112, pl. 6 (_Tænia anatina_).—Stiles, 1896f, pp. 39–40, pl. 9, figs. 100–111; pl. 10, figs. 112–115 (_Drepanidotænia anatina_).—Cohn, 1901b, pp. 322–323.

Hosts.—Spatula clypeata, Dafila acuta, Chaulelasmus streperus, Anas platyrhynchos, Anas platyrhynchos domestica, Cygnus olor domesticus, Fulica atra.

HYMENOLEPIS ARCUATA Kowalewski, 1904.

For description see Kowalewski, 1905a, pp. 3–9, pl. 7, figs. 1–9; 1905b, pp. 532–533, pl. 14, figs. 1–9.

Host.—Marila marila.

HYMENOLEPIS ARDEÆ [a] Fuhrmann, 1906.

For description see Fuhrmann, 1906b, pp. 451–452, figs. 37–39.

Host.—Butorides virescens.

HYMENOLEPIS BASCHKIRIENSIS (Clerc, 1902) Fuhrmann, 1906.

For description see Clerc, 1903, pp. 288–290 (_Drepanidotænia baschkiriensis_).

Host.—Larus canus.

HYMENOLEPIS BISACCATA Fuhrmann, 1906.

For description see Fuhrmann, 1906b, pp. 444–445, figs. 21–24.

Host.—Cairina moschata.

HYMENOLEPIS BRACHYCEPHALA (Creplin, 1829).

For description see Krabbe, 1869b, pp. 294–295, pl. 6, figs. 136–140 (_Tænia brachycephala_).—Cohn, 1901b, pp. 280–284, pl. 29, figs. 13, 14.

Host.—Machetes pugnax.

HYMENOLEPIS BRASILIENSIS Fuhrmann, 1906.

For description see Fuhrmann, 1906b, p. 446, fig. 26.

Host.—Antrostomus carolinensis.

*HYMENOLEPIS CANTANIANA (Polonio, 1860) Ransom, 1909.

For description see Ransom, 1909, pp. 36–41, figs. 28, 29 (the present paper).

Hosts.—Meleagris gallopavo domestica, *_Pavo cristatus_, *_Gallus gallus domesticus_, _Phasianus colchicus._

HYMENOLEPIS CAPILLARIS (Rudolphi, 1810) Fuhrmann, 1906.

For description see Krabbe, 1869b, p. 307, pl. 7, fig. 179 (_Tænia capillaris_).

Hosts.—Gavia stellata, Gavia arctica, Gavia immer, Colymbus auritus.

HYMENOLEPIS CAPILLAROIDES Fuhrmann, 1906.

For description see Fuhrmann, 1906b, pp. 355–356, figs. 6, 7.

Host.—Colymbus dominicus.

*HYMENOLEPIS CARIOCA (Magalhaes, 1898) Ransom, 1902.

For description see Ransom, 1902a, pp. 151–158, pl. 23, figs. 1–7; pl. 24, figs. 8–10; 1905b, pp. 274–276, figs. 3, 10, 22, 28.

Host.—*_Gallus gallus domesticus._

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[a] See discussion under _Dilepis unilateralis_ (p. 72).

Genus ACOLEUS Fuhrmann, 1899.

Generic diagnosis.—Acoleidæ: Scolex with armed rostellum. A single set of reproductive organs in each segment. Male genital pores regularly alternate. Cirrus pouch passes ventral of longitudinal excretory vessels and nerve. Testicles numerous. Vagina functions as a very large seminal receptacle. Adults in birds.

Type-species.—*Acoleus armatus* Fuhrmann, 1899 = *Acoleus vaginatus* (Rudolphi, 1819) Fuhrmann, 1900.

ACOLEUS VAGINATUS (Rudolphi, 1819) Fuhrmann, 1900.

For description see Fuhrmann, 1899e, pp. 620–622, figs. 4–6 (*A. armatus*); 1899g, pp. 347–350, pl. 17, figs. 10–14 (*A. armatus*); 1900c, pp. 369–370.

Host.—*Himantopus mexicanus.*

Genus GYROCŒLIA Fuhrmann, 1899.

Brochocephalus Linstow, 1906 (type, *B. paradoxus* Linstow, 1906; see Fuhrmann, 1908a, p. 86).

Generic diagnosis.—Acoleidæ: Rostellum armed with a single crown of hooks arranged in a zigzag row having eight angles. A single set of reproductive organs in each segment. Male pores irregularly alternate. Cirrus pouch passes between the longitudinal excretory vessels and dorsal of the nerve. Testicles few. Seminal receptacle very small. Uterus ring-like with numerous outpocketings and with an opening in gravid segments dorsally and ventrally. Adults in birds.

Type-species.—*Gyrocœlia perversus* Fuhrmann, 1899.

GYROCŒLIA PARADOXA (Linstow, 1906).

For description see Linstow, 1906, p. 183, pl. 2, figs. 36, 38; pl. 3, figs. 35, 37 (*Brochocephalus paradoxus*).[a]

Host.—*Ægialitis mongola.*

Genus DIPLOPHALLUS Fuhrmann, 1900.

Generic diagnosis.—Acoleidæ: A double set of male reproductive organs and a single set of female organs in each segment. Two vaginæ functioning as large seminal receptacles. Adults in birds.

Type-species.—*Diplophallus polymorphus* (Rudolphi, 1819, partim Krabbe, 1869) Fuhrmann, 1900.

DIPLOPHALLUS POLYMORPHUS (Rudolphi, 1819) Fuhrmann, 1900.

For description see Krabbe, 1869b, pp. 301–302, pl. 7, figs. 163, 164 (*Tænia polymorpha*).—Wolffhügel, 1900a, pp. 136–152, pl. 5, figs. 67–80, pl. 6, figs. 81–84 (*Tænia polymorpha*).—Cohn, 1900c, pp. 277–288, pl. 15, figs. 19–22 (*Tænia polymorpha*).—Fuhrmann, 1900c, p. 371.

Host.—*Himantopus mexicanus.*

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[a] Fuhrmann (1908a, p. 86) examined the original material of *Brochocephalus paradoxus* and found that this species belongs in *Gyrocœlia* in spite of Linstow's different description.

Genus SHIPLEYA[a] Fuhrmann, 1907.

Generic diagnosis.—Acoleidæ: Scolex without rostellum, but with apical papilla. Single set of reproductive organs in each segment. Male genital pores regularly alternate. Cirrus conical in shape, armed with large hooks. Yolk gland dorsal of ovary. Vagina represented only by a small seminal receptacle in central portion of segment. Uterus at first ring shaped, later becomes much branched. Adults in birds.

Type-species.—*Shipleya inermis* Fuhrmann, 1907.

Genus DIOICOCESTUS Fuhrmann, 1900.

Generic diagnosis.—Acoleidæ: Diœcius, entire strobila male or female. Female thicker and broader than male. Male with a double set; female with a single set of reproductive organs in each segment. Irregularly alternating vagina reaches almost to the edge of the segment. Eggs with three envelopes. Adults in birds.

Type-species.—*Dioicocestus paronai* Fuhrmann, 1900.

DIOICOCESTUS ACOTYLUS Fuhrmann, 1904.

For description see FUHRMANN, 1904a, pp. 327–331; 1904b, pp. 131–148, pl. 10, figs. 2–11.

Host.—*Colymbus dominicus.*

DIOICOCESTUS PARONAI Fuhrmann, 1900.

For description see FUHRMANN, 1900c, pp. 363–366, figs. 1–3.

Host.—*Plegadis guarauna.*

Family AMABILIIDÆ (emended name).

"*Amabilinidæ*" FUHRMANN, 1907.

Family diagnosis.—Tænioidea: Scolex with armed rostellum; suckers usually unarmed. Segments with lateral appendages. A double or single set of reproductive organs in each segment. Male genital pores marginal. Vaginal opening lacking, replaced by the marginal, ventral, or dorsal opening of an accessory genital canal. Egg with thin transparent shells. Adults in birds.

Type-genus.—*Amabilia* Diamare, 1893.

Genus AMABILIA Diamare, 1893.

Aphanobothrium LINSTOW, 1906 (type, *A. catenatum* LINSTOW, 1906; see FUHRMANN, 1908a, p. 88).

Generic diagnosis.—Amabiliidæ: Scolex very small with armed rostellum. A double set of male reproductive organs in each segment, with two pores, one on either side of the segment. Cirrus

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[a] This genus and its type-species mentioned by Fuhrmann in 1907 (1907a, p. 294), were described by him in 1908 (1908b, p. 70).

armed with strong spines. Testicles numerous, in median field. Female organs median, a single set in each segment. Uterus forming a cage-like meshwork consisting (Fuhrmann, 1908a, p. 88) of a dorso-ventral ring with dorso-ventral anastomoses. Accessory vagina opening ventrally, communicating (?) with a canal from the excretory system opening in the ventral surface of the segment in the median line. Adults in birds.

Type-species.—*Amabilia lamelligera* (Owen, 1832) Diamare, 1893

Genus SCHISTOTÆNIA Cohn, 1900.

Generic diagnosis.—Amabiliidæ: Scolex with very large, armed rostellum. A single set of reproductive organs in each segment. Male genital pores irregularly alternate. Male deferent canal passes between the longitudinal excretory vessels. Testicles numerous, extending across the entire width of the segment. Vagina absent. Vaginal functions performed by a median, dorso-ventral canal (accessory vagina) opening on the surface of the segment dorsally and ventrally. Adults in birds.

Type-species.—*Schistotænia macrorhyncha* (Rudolphi, 1810) Cohn, 1900 = *Schistotænia scolopendra* (Diesing, 1850). (See Fuhrmann, 1907b, p. 534.)

SCHISTOTÆNIA MACRORHYNCHA (Rudolphi, 1810) Cohn, 1900.

For description see KRABBE, 1869b, p. 305, pl. 7, fig. 172 (*Tænia macrorhyncha*).—COHN, 1900c, pp. 265–277, pl. 14, figs. 8–18 (*S. macrorhyncha* and *S. scolopendra*).—CLERC, 1907, pp. 704–708, pl. 1, figs. 3–7.

Hosts.—*Colymbus dominicus*, *Colymbus auritus*.

Genus TATRIA Kowalewski, 1904.

Generic diagnosis.—Amabiliidæ: Rostellum with a single crown of few large hooks at apex and with numerous rows of small spine-like hooks behind the crown of large hooks. Suckers and posterior portion of head covered with minute spines. Segments not numerous (about 30). A single set of reproductive organs in each segment. Male genital pores regularly alternate. Cirrus pouch large. Testicles not numerous (7 in the type species). Male and female canals pass between the longitudinal excretory vessels. Distal end of vagina instead of opening to the exterior turns backward into the next following segment and opens into the seminal receptacle of that segment. Seminal receptacles in median line of strobila. An accessory vagina present in the opposite side of the segment from the cirrus pouch, sometimes with an opening in the margin of the segment. Adults in birds.

Type-species.—*Tatria biremis* Kowalewski, 1904.

TATRIA APPENDICULATA Fuhrmann, 1908.

For description see FUHRMANN, 1908b, p. 69, figs. 56, 57.

Host.—*Colymbus dominicus.*

TATRIA BIREMIS Kowalewski, 1904.

For description see KOWALEWSKI, 1904c, pp. 284–304, pls. 5–6, figs. 1–21; 1904e, pp. 367–369, pl. 9, figs. 1–10; pl. 10, figs. 11–21.

Host.—*Colymbus auritus.*

Family FIMBRIARIIDÆ Wolffhügel, 1898.

Family diagnosis.—Tænioidea: Scolex small, unstable, and frequently lost, with rostellum armed with a single row of hooks. Large pseudo-scolex. Strobila without segments, but with transverse grooves which produce an appearance of segmentation. Three pairs of longitudinal excretory vessels. Reproductive organs not segmentally arranged. Genital pores marginal, most of them opening on the same side of the segment. Testicles numerous, arranged in transverse rows. Uterus not persistent, breaking down into a large number of egg sacs. Egg with thin transparent shells. Adults in birds.

Type-genus.—*Fimbriaria* Frölich, 1802.

Genus FIMBRIARIA Frölich, 1802.

Epision LINTON, 1892 (type, *Epision plicatus* LINTON, 1892).

Notobothrium LINSTOW, 1905 (type, *Notobothrium arcticum* LINSTOW, 1905= *Fimbriaria fasciolaris* PALLAS; see FUHRMANN, 1908a, p. 90).

Generic diagnosis.—Fimbriariidæ: With the characters of the family.

Type-species.—*Fimbriaria malleus* Frölich, 1802 = *Fimbriaria fasciolaris* (Pallas, 1781) Wolffhügel, 1899.

FIMBRIARIA FASCIOLARIS (Pallas, 1781) Wolffhügel, 1899.

For description see WOLFFHÜGEL, 1900a, pp. 67–135, figs. 1–66.

Hosts.—*Mergus serrator, Oidemia americana, Oidemia fusca, Somateria mollissima, Harelda hyemalis, Clangula clangula, Marila marila, Netta rufina, Cairina moschata domestica, Spatula clypeata, Nettion crecca, Mareca penelope, Anas platyrhynchos, Anas platyrhynchos domestica, Anser anser domesticus, ?Gallus gallus domesticus.*

FIMBRIARIA PLANA Linstow, 1905.

For description see LINSTOW, 1905t, pp. 362–365, pl. 23, figs. 10–14.

Host.—*Anas platyrhynchos.*

GENERA IMPERFECTLY KNOWN.

Genus TETRACISDICOTYLA Fuhrmann, 1907.

Generic diagnosis.—Tænioidea: Scolex relatively large, without rostellum. In the posterior portion of each sucker a peculiar muscular organ simulating a pair of smaller suckers. Neck absent. Segmentation of the strobila indistinct. A single set of reproductive organs in each segment. Genital pores marginal, irregularly alternating. Cirrus pouch large. Vas deferens coiled. Testicles numerous. Vagina opens into the genital pore in front of cirrus pouch. Adults in birds.

Type-species.—*Tetracisdicotyla macroscolecina* Fuhrmann, 1907.

TETRACISDICOTYLA MACROSCOLECINA Fuhrmann, 1907.

For description see FUHRMANN, 1907b, pp. 535–536, fig. 43.

Host.—*Butorides virescens.*

Genus COPESOMA Sinitsin, 1896.

Generic diagnosis.—Tænioidea: Scolex with large rostellum. Genital pores irregularly alternate, in young segments ventral, in gravid segments marginal. Adults in birds.

Type-species.—*Copesoma papillosum* Sinitsin, 1896.

COPESOMA PAPILLOSUM Sinitsin, 1896.

For description see FUHRMANN, 1901a, p. 761.

Host.—?*Pisobia damacensis.*

IMPERFECTLY KNOWN SPECIES.

TÆNIA COLLICULORUM Krabbe, 1869.

For description see KRABBE, 1869b, p. 330, pl. 9, fig. 259.

Host.—*Riparia riparia.*

TÆNIA CONICA[a] Molin, 1858.

For description see MOLIN, 1861c, pp. 253–254, pl. 7, figs. 1, 2.—STILES, 1896f, pl. 3, figs. 35, 36.

Host.—*Anas platyrhynchos.*

TÆNIA DISTINCTA Lönnberg, 1889.

For description see LÖNNBERG, 1889a, pp. 12–13, figs. 3, 4.

Host.—*Larus canus.*

TÆNIA FILUM[b] Goeze of Linton, 1892.

For description see LINTON, 1892l, pp. 106–107, pl. 8, figs. 72–78.

Host.—*Larus californicus.*

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[a] Part of Molin's original (Bureau of Animal Industry, No. 1390) shows the long, prominent rostellum, with marks indicating that at one time there were 10 hooks present.

[b] According to Fuhrmann (1908a, p. 126) this form is probably a *Hymenolepis*, possibly *H. fusus*.

TÆNIA LEUCKARTI Krabbe, 1869.
For description see KRABBE, 1869b, p. 337, pl. 10, figs. 268, 269.

Host.—Ardea cinerea.

TÆNIA MACROCANTHA Linton, 1892.
For description see LINTON, 1892l, p. 107, pl. 8, figs. 79–82.

Host.—Oidemia americana.

TÆNIA MEGALORHYNCHA Krabbe, 1869.
For description see KRABBE, 1869b, p. 284, pl. 5, figs. 104, 105.

Host.—Arquatella maritima.

TÆNIA MUSCICAPÆ Linstow.
Mentioned by FUHRMANN, 1908a, pp. 96, 173, 182.

Host.—Motacilla alba.

TÆNIA ODIOSA Leidy, 1887.
For description see LEIDY, 1887a, pp. 5–6, figs. 9–11; 1904a, pp. 202–203, figs. 9–11.

Host.—Colinus virginianus.

TÆNIA OPORORNIS Leidy, 1887.
For description see LEIDY, 1887a, pp. 9–10, figs. 23–25; 1904a, pp. 206–207, figs. 23–25.

Host.—Oporornis formosa.

TÆNIA PESTIFERA Leidy, 1855.
For description see LEIDY, 1855a, p. 443; 1887a, pp. 3–4, figs. 2–4; 1904a, pp. 76, 201, figs. 2–4.

Hosts.—Icteria virens, Dolichonyx oryzivorus.

TÆNIA PLATYCEPHALA Rudolphi, 1810.
For description see RUDOLPHI, 1810a, p. 94; 1819a, p. 508.

Hosts.—Alauda arvensis, Saxicola œnanthe, Anthus pratensis.

TÆNIA SIMPLA Leidy, 1887.
For description see LEIDY, 1887a, p. 8, fig. 18; 1904a, p. 205, fig. 18.

Host.—Antrostomus carolinensis.

TÆNIA STRIGIS-ACADICÆ Leidy, 1855.
For description see LEIDY, 1855a, p. 444; 1904a, p. 76.

Host.—Cryptoglaux acadica.

TÆNIA TETRABOTHRIOIDES Lönnberg, 1890.
For description see LÖNNBERG, 1890b, pp. 13–15.

Host.—Pelidna alpina.

TÆNIA URNIGERA Leidy, 1887.
For description see LEIDY, 1887a, pp. 4–5, figs. 5–8; 1904a, p. 202, figs. 5–8.

Host.—Molothrus ater.

TÆNIA VEXATA Leidy, 1887.
For description see LEIDY, 1887a, pp. 7–8, figs. 15, 16; 1904a, p. 204, figs. 15, 16.

Host.—Phlœotomus pileatus.

TÆNIA VIATOR Leidy, 1887.
For description see LEIDY, 1887a, pp. 6–7, figs. 12–14; 1904a, p. 203, figs. 12, 14.

Host.—Elanoides forficatus.

COMPENDIUM OF SPECIES PARASITIC IN NORTH AMERICAN BIRDS ARRANGED ACCORDING TO HOSTS.

The scientific names of hosts have been selected for me by Mr. H. C. Oberholser, of the Bureau of Biological Survey, U. S. Department of Agriculture.

Species of tapeworms collected in this country of which I have examined specimens are indicated by an asterisk, and the names of the hosts in which they were found are similarly marked.

COLYMBIFORMES.

- **Gavia stellata** (Pontoppidan).
  - *Tetrabothrius macrocephalus*, p. 60.
  - *Hymenolepis capillaris*, p. 91.
  - *rostellata*, p. 96.
- **Gavia arctica** (Linnæus).
  - *Tetrabothrius macrocephalus*, p. 60.
  - *Hymenolepis capillaris*, p. 91.
  - *rostellata*, p. 96.
- **Gavia immer** (Brünnich).
  - *Tetrabothrius macrocephalus*, p. 60.
  - *Hymenolepis capillaris*, p. 91.
  - *rostellata*, p. 96.
- **Colymbus dominicus**[a] Linnæus.
  - *Choanotænia bilateralis*, p. 75.
  - *Hymenolepis capillaroides*, p. 91.
  - *Dioicocestus acotylus*, p. 103.
  - *Schistotænia macrorhyncha*, p. 104.
  - *Tatria appendiculata*, p. 105.
- **Colymbus auritus** Linnæus.
  - *Tetrabothrius macrocephalus*, p. 60.
  - *Hymenolepis capillaris*, p. 91.
  - *furcifera*, p. 93.
  - *podicipina*, p. 96.
  - *Schistotænia macrorhyncha*, p. 104.
  - *Tatria biremis*, p. 105.

PROCELLARIIFORMES.

- **Puffinus puffinus** (Brünnich).
  - *Tetrabothrius heteroclitus*, p. 60.
- **Puffinus kuhli**[b] (Boie).
  - *Tetrabothrius heteroclitus*, p. 60.
- **Priocella glacialoides** (Smith).
  - *Tetrabothrius heteroclitus*, p. 60.
- **Daption capensis** (Linnæus).
  - *Tetrabothrius heteroclitus*, p. 60.
- **Fulmarus glacialis** (Linnæus).
  - *Tetrabothrius monticellii*, p. 60.
- **Diomedea exulans** Linnæus.
  - *Tetrabothrius diomedeæ*, p. 60.
  - *heteroclitus*, p. 60.
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- **Diomedea albatrus** Pallas.
  - *Tetrabothrius heteroclitus*, p. 60.
  - *torulosus*, p. 60.
- **Phœbetria palpebrata** (Forster).
  - *Tetrabothrius umbrella*, p. 61.

CICONIIFORMES.

- **Phalacrocorax carbo** (Linnæus).
  - *Dilepis scolecina*, p. 72.
- **Sula bassana** (Linnæus).
  - *Tetrabothrius*, species, p. 61.
- **Sula leucogastra** (Boddaert).
  - *Tetrabothrius pelecani*, p. 60.
- **Fregata aquila** (Linnæus).
  - ? *Tetrabothrius pelecani*, p. 60.
- **Nycticorax nycticorax**[c] (Linnæus).
  - *Tetrabothrius porrigens*, p. 60.
  - *Gryporhynchus pusillus*, p. 83.
  - *Hymenolepis microcephala*.
- **Butorides virescens** (Linnæus).
  - *Dilepis unilateralis*, p. 72.
  - *Hymenolepis ardeæ*, p. 91.
  - *Tetracisdicotyla macroscolecina*, p. 106.

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[a] The typical form, *C. dominicus dominicus* is South American; *C. dominicus brachypterus* Chapman is the North American form.

[b] Hypothetical North American form.

[c] The typical form is European; the North American form is *N. nycticorax nævius* (Boddaert).

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Anomotænia aurita, p. 77.
Casmerodius egretta (Gmelin).
Dilepis unilateralis, p. 72.
Ardea cinerea Linnæus.
Dilepis unilateralis, p. 72.
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?*Anonchotænia longiovata*, p. 87.
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Plegadis autumnalis (Linnæus).
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***Ajaia ajaja** (Linnæus).
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Mergellus albellus (Linnæus).
Hymenolepis tenuirostris, p. 97.
Oidemia americana Swainson and Richardson.
Hymenolepis compressa, p. 92.
Fimbriaria fasciolaris, p. 105.
Tænia macrocantha, p. 107.
Oidemia fusca (Linnæus).
Lateriporus biuterinus, p. 73.
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Somateria spectabilis (Linnæus).
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sibirica, p. 96.
Aploparaksis birulai, p. 99.
Somateria mollissima[a] (Linnæus).
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Hymenolepis fallax, p. 92.
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Fimbriaria fasciolaris, p. 105.
Harelda hyemalis (Linnæus).
Lateriporus teres, p. 73.
Choanotænia borealis, p. 75.
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Fimbriaria fasciolaris, p. 105.
Histrionicus histrionicus (Linnæus).
Hymenolepis pachycephala, p. 95.
Clangula clangula[b] (Linnæus).
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Netta rufina (Pallas).
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Fimbriaria fasciolaris, p. 105.
Cairina moschata[c] (Linnæus).
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papillata, p. 95.
Cairina moschata domestica.
Fimbriaria fasciolaris, p. 105.

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[a] The typical form occurs only in the Old World; the North American form is *Somateria mollissima borealis* Brehm.

[b] The typical form occurs only in the Old World; *C. clangula americana* Bonaparte is the North American form.

[c] In its natural state this species occurs only in South America, but is domesticated in the United States.

Spatula clypeata (Linnæus).

- *Hymenolepis anatina*, p. 91.
  - *echinocotyle*, p. 92.
  - *gracilis*, p. 93.
  - *octacantha*, p. 95.
- *Diploposthe lævis*, p. 101.
- *Fimbriaria fasciolaris*, p. 105.

Nettion crecca (Linnæus).

- *Hymenolepis fragilis*, p. 93.
  - *gracilis*, p. 93.
  - *megalops*, p. 94.
  - *octacantha*, p. 95.
- *Diorchis acuminata*, p. 42.
- *Aploparaksis furcigera*, p. 100.
- *Diploposthe lævis*, p. 101.
- *Fimbriaria fasciolaris*, p. 105.

* **Dafila acuta** (Linnæus).

- *Hymenolepis anatina*, p. 91.
  - *collaris*, p. 92.
  - **megalops*, p. 94.
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Mareca penelope (Linnæus).

- *Hymenolepis collaris*, p. 92.
  - *coronula*, p. 92.
  - *fallax*, p. 92.
  - *fasciculata*, p. 93.
  - *gracilis*, p. 93.
- *Diorchis acuminata*, p. 42.
- *Fimbriaria fasciolaris*, p. 105.

Chaulelasmus streperus (Linnæus).

- *Hymenolepis anatina*, p. 91.
  - *fragilis*, p. 93.
  - *gracilis*, p. 93.
  - *octacantha*, p. 95.
  - *teresoides*, p. 97.
- *Diorchis acuminata*, p. 42.
- *Diploposthe lævis*, p. 101.

Anas rubripes Brewster.

- *Hymenolepis lanceolata*, p. 94.
- *Diploposthe lævis*, p. 101.

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- *Diploposthe lævis*, p. 101.
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  - *plana*, p. 105.
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- *Hymenolepis anatina*, p. 91.
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  - *megalops*, p. 94.
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  - *tenuirostris*, p. 97.
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- *Echinocotyle rosseteri*, p. 98.
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- *Lateriporus biuterinus*, p. 73.

Branta bernicla [a] (Linnæus).

- *Hymenolepis lanceolata*, p. 94.
  - *setigera*, p. 96.

Branta canadensis (Linnæus).

- *Diploposthe lævis*, p. 101.

Branta leucopsis (Bechstein).

- *Hymenolepis longivaginata*, p. 94.
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Anser anser [b] (Linnæus).

- *Hymenolepis collaris*, p. 92.
  - *coronula*, p. 92.
  - *creplini*, p. 92.
  - *fasciculata*, p. 93.
  - *lanceolata*, p. 94.
  - *setigera*, p. 96.

Anser anser domesticus.

- *Hymenolepis collaris*, p. 92.
  - *fasciculata*, p. 93.
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  - *tenuirostris*, p. 97.
- *Tænia conscripta*, p. 100.
- *Fimbriaria fasciolaris*, p. 105.

Anser fabalis (Latham).

- *Hymenolepis setigera*, p. 96.

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[a] The typical form occurs only in the Old World; the North American form is *B. bernicla glaucogastra* (Brehm).

[b] In its natural state this species occurs only in the Old World, but is domesticated in the United States.

- __Anser albifrons__ (Gmelin).
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    - _fasciculata_, p. 93.
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  - _Hymenolepis æquabilis_, p. 90.
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  - _Hymenolepis æquabilis_, p. 90.
    - _anatina_, p. 91.
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- __Olor cygnus__ (Linnæus).
  - _Hymenolepis æquabilis_, p. 90.
    - _creplini_, p. 92.
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  - _Tænia cylindracea_, p. 100.
- __Falco æsalon__ Tunstall.
  - _Tænia cylindracea_, p. 100.
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  - _Tænia cylindracea_, p. 100.
- __Haliæetus albicilla__ (Linnæus).
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- __Aquila chrysaëtos__ (Linnæus).
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- *__Pavo cristatus__[c] Linnæus.
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  - *_Davainea cesticillus_, p. 67.
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  - _Davainea friedbergeri_, p. 68.
  - _Choanotænia infundibulum_, p. 75.
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    - _phasianina_, p. 95.
- *__Centrocercus urophasianus__ (Bonaparte).
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  - ? _Hymenolepis microps_, p. 94.
- *__Pediœcetes phasianellus columbianus__ (Ord).
  - *_Rhabdometra nullicollis_, p. 25.
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  - *_Diorchis acuminata_, p. 42.
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[a] In its natural state this species occurs only in the Old World, but is domesticated in the United States.

[b] The typical form occurs only in the Old World; the North American form is _F. peregrinus anatum_ Bonaparte.

[c] Domesticated in North America.

[d] Introduced in North America.

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[a] Fuhrmann (1908 a, p. 118) lists this species as a parasite of *P. damacensis*, a possible error. Stossich (1892 b) described *Tænia vallei* as a parasite of *Tringa minuta*, but Fuhrmann has not listed it under the latter host.

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[a] In its natural state this species occurs only in the Old World.

[b] The typical form is South American; the North American form is *T. melancholicus couchi* Baird.

[c] Introduced in North America.

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[a] The typical form is confined to the Old World; the North American form is *Pica pica hudsonia* (Sabine).

[b] The typical form occurs only in the Old World; two North American forms are recognized, *C. corax principalis* Ridgway (northern), and *C. corax sinuatus* Wagler (southern).

[c] Introduced in North America.

[d] The typical form occurs only in the Old World; the North American form is *L. curvirostra minor* (Brehm).

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